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OF THE

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VOL. XIII.

SESSION 1887-88.

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1888.

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PREFACE.

THIS, the thirteenth volume of the Society's Transactions, contains a record of its proceedings during the Session 1887–88.

In it, as in former volumes, the views brought forward in the papers are to be considered as those of the writers themselves, and not as those of the Society as a body.

October 1888.

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1877 Thomson, Mr J. Stitt, Dalkeith.
1887 Thyne, Dr T. J., 1 Dean Terrace.
1887 Tillie, Dr Joseph, 11 Castle Terrace.
1887 Tristan, Mr R. J., Retford, Notts.
1869 Turnbull, Dr M., Coldstream.

1872 Underhill, Dr C. E., 8 Coates Crescent.
1885 Underhill, Dr Fred. T., Princes End, Tipton Green, Staffordshire.
1879 Underhill, Dr T. Edgar, Bromsgrove, Worcestershire.

1887 Vassie, Dr Richard, Kirkcaldy.

1886 Walker, Dr A. Wallace, 24 Forth Street.
1879 Wallace, Dr Abraham, 4 Newton Place, Glasgow.
1887 Watson, Mr P. H., 72 Jesmond Road, Newcastle-on-Tyne.
1865 Watson, Dr W., Mid-Calder.
1881 Waugh, Dr John, 36 Finsbury Pavement, London, E.C.
1881 Webster, Dr A. D., 20 Newington Road.
1882 Weight, Dr R. Hill, 2 Copthall Buildings, London, E.C.
1840 Weir, Dr T. Graham, 36 Heriot Row.
1879 Weir, Dr Walter, Gatestone, Upper Norwood, London, S.E.
1886 Whitton, Dr A. B., Aberchirder.
1887 Wicks, Mr Charles, South View House, West Parade, Newcastle-on-Tyne.
1867 Will, Dr Ogilvie, 305 Union Street, Aberdeen.
1845 Wilson, Dr David, 12 Dean Terrace.
1879 Wilson, Dr T. D., 10 Newington Road.
1880 Wood, Dr Russell, 9 Darnaway St.
1886 Wood, Dr Thomas, 55 Ferry Road.
1887 Wright, Dr W. F., 6 Nelson St.
1879 Wylie, Dr Hamilton, 1 George Place.

1861 Young, Dr James, 14 Ainslie Place.
1859 Young, Dr Peter, 43 Heriot Row.
1871 Young, Dr Peter A., 25 Manor Place.

1850 Ziegler, Dr Wm., 47 George Square.

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TRANSACTIONS

OF THE

EDINBURGH OBSTETRICAL SOCIETY,

FOR SESSION XLIX., 1887-88.

MEETING I.—OCTOBER 26, 1887.

Dr J. HALLIDAY CROOM, *retiring President, afterwards* Dr UNDERHILL, *President-elect, in the Chair.*

I. The retiring President, *Dr Halliday Croom*, gave the following

VALEDICTORY ADDRESS.

TO-NIGHT I have the double duty to perform—to open the forty-ninth session of our Society, and to restore to you the trust which you so generously placed in my hands two years ago, when you conferred on me the honour of occupying the presidential chair.

In doing so, I desire, *first* and *specially*, to express how deeply grateful I am to you for permitting me to enjoy this honour, than which I aspire to none higher, and to thank you for all the courtesy and consideration I have received from you during my tenure of office. Our Society has all but entered on its Jubilee, and I leave it to the abler pen and worthier lips of my successor, who will indeed be our Jubilee president, to review its past and pronounce over it, as he is so well able to do, a graceful eulogium. Mine is a simpler task; my retrospect, for I take it that such is my duty, goes not further back than the period I have occupied this chair.

The past year has been even more fertile than some of its predecessors in the amount of excellent, original, clinical, and

critical work which the Fellows have accomplished, and I do not think I shall be accused of exaggeration when I claim for our Transactions a place second to no other similar society.

Our meetings have been unusually well attended, and the discussions have been lively and to the point. It is certainly a most desirable feature in our Society that the papers read are not unduly long, and that the critical remarks are short and sharp. The custom which we have always adopted of having our discussion reported in detail has ever seemed to me most useful, as by this means the varying opinions on any special subject are permanently recorded, and much interesting matter may be gained from them which would otherwise be lost.

The past year is noteworthy, because in it we have had the largest accession of members compared with any previous session in our history as a Society, no less than 42 new Fellows having been elected—a very substantial addition not less to our membership than our funds.

The Fellowship of our Society now amounts to 390,—40 honorary; 92 corresponding; 258 ordinary.

If I may venture to cast a horoscope, our Society will emerge from the present modest room which has so long sheltered it into a hall more worthy of it. Its meetings will no longer be round this familiar table, but conducted with a dignity and solemnity befitting its age and importance. Perhaps, if indeed the march of political events be not too rapid, some of the younger Fellows may see it develop into a *Royal Society*, where, with accumulating wealth, it will be able to foster original research by handsome grants.

Obstetrics will then have developed into an *accurate science*. The advance of sanitation and social science will have rid our country of epidemics and made pelvic deformities curiosities of the past. Improving morals and the spread of higher self-control will have deprived the profession of its most cherished etiological factor in the production of disease, and, when obscure symptoms do present themselves, they will not be attributable *then*, as invariably they are *now*, to syphilis. Abdominal surgery will have achieved its highest triumph, and when, now and again at rare intervals, an insuperable obstruction to delivery does occur, a living child will be removed through an abdominal incision with as much safety to the mother as an ovarian tumour can be now. Perhaps by that time ovariotomy itself will have disappeared from the list of justifiable operations, and cancer and ovarian tumour will be dissipated, as it is now proposed to disintegrate fibroids.

It may be that the then President, with a grace of manner and a firm but gentle suasion, unknown to the present occupant, may have to control the deliberations of a mixed assembly, composed

in great measure of what we, at present, regard as the gentler sex. Then, Gentlemen, we may rest assured that the attractions of the Obstetrical Society will, for young physicians, outweigh all others; the meetings will be weekly instead of monthly, enlivened by the most sparkling debate; and when some of the present Fellows, then hoary with age, forgetting the change and mindful only of the past, should read a lengthy and dull dissertation, as Lord Cockburn said of a prolix pleader, "exhausting time and encroaching on eternity," his lucubration will be welcomed rather than otherwise, as affording a suitable interlude for an interesting conversation between a stern obstetrician and an engaging and attractive gynæcologist. Whether this Utopia will be reached or not; whether, if possible, it were desirable, time will tell. For us our work is in the present, and, professionally, we have to deal with it alone.

During the past two years our department has not stood still. There have been rapid changes in opinion and development in art. Our knowledge of the phenomena of labour, though far from perfect, is yet slowly and surely being placed on a firmer basis; and in the development of these problems, nothing has shed more light than recent research in the anatomy of labour, and in this department, through the researches of Barbour, our Society has taken a foremost part. The possibility of work in this direction seems as yet unlimited, and to those who have the ability and time, and the good fortune to secure the material, it seems certain that in no direction will honest work have a more ample reward.

The physiology of the uterus, more especially in relation to its innervation and electrical phenomena, is a field full of great expectation, and in this direction, through the work of Milne Murray, our Society has contributed a lasting addition; while in pathology, the basis of all accurate treatment, the work of Berry Hart, on extrauterine pregnancy, stands prominently forward as a research of a peculiarly interesting nature.

To Dr Foulis we are indebted for ventilating afresh the subject of axis-traction forceps. This is not the time for me to express any opinion on the ingenious form of instruments which he has invented. But I desire to avail myself of the opportunity thus afforded of saying a single word with regard to the axis-traction forceps generally. Of their value no one can possibly have a higher estimate. Yet it seems to me that sufficient attention is not paid to one point, viz., that, with increased power in a proper axis, efforts at extraction should be modified. For the power we possess with the axis-traction is so much greater than with ordinary forceps, that infinitely more care in the employment of this force must be observed by the operator, otherwise, as one draws from the instrument an indication of the proper line of traction for each

particular pelvis, we are enabled to expend our efforts in traction to the best advantage and by the same means, and, at the same time, to recognise the limits of SAFE traction. The instrument, accordingly, should be regarded primarily as a means of economising the power of the operator, and of materially diminishing the risk of the patient from excessive injudicious force. Hence, therefore, the limits of safe traction with this instrument are narrower than with the older form, and therefore it should be strongly insisted on that no operator is justified in working up to the mechanical limits of this forceps; but, on the contrary, having ascertained the limits of safe traction earlier with this instrument than with any of its predecessors, he is bound, in consideration for the mother, to proceed to some of the sacrificial methods of delivery; and the one which seems best suited for such cases, and a method which gets scant recognition, is to perforate the head while still grasped by the forceps, and continue traction in the proper axis with the traction rods.

Nothing, I may safely say, has attracted the attention of gynæcologists more, during the past year, than the application of powerful currents of electricity for the modification of symptoms and disintegration of fibroid tumours of the uterus.

The application of electricity for such purposes is by no means a novelty. It has been tried in various ways and by various operators for many years, and though now and again encouraging results have been secured, it has never as yet scored a brilliant success. Whether Apostoli's method is to carry off the palm and mark an epoch in uterine surgery remains to be seen. Like every other novelty in medicine, it is at present being done to death. The special feature of Apostoli's teaching and practice is the use of currents of high intensity, carefully measured by specially constructed instruments, and brought directly in contact with the offending structure by one or other pole of the battery. I venture to think it specially desirable that this latter feature, which Apostoli terms the unipolar method, should be primarily insisted on and appreciated. The diverse effects of the two poles admits of simple demonstration, and it is a characteristic feature of Apostoli's treatment that he employs the astringent effects of the one pole or the disintegrating effects of the other, according as the circumstances of each individual can demand.

In all former attempts to utilize electricity for such purposes, no device was adopted to admit of the selective procedure; and the merits and success of Apostoli's method depend largely on the adoption of a large external surface electrode composed of wet clay, by means of which the one is dispersed with least inconvenience to the patient.

As yet it is premature to offer any opinion as to the ultimate results of this method of treatment. Theoretically, it seems to

commend itself. Like others, I am endeavouring to give the ingenious suggestion of Apostoli a fair trial, and am waiting with interest the issue of the cases in which it has been employed. At the same time, it cannot be too anxiously insisted on that the operation is one involving very grave risk to the patient, and demanding very exceptional care on the part of the physician.

The last few years have brought varying fortune to antiseptics in midwifery and gynæcology. That antiseptics founded on a germ theory have been proved to be unnecessary to brilliant success in abdominal surgery is a fact which Mr Tait has placed beyond the region of dispute. His phenomenal success, without the adoption of any antiseptic precaution at all, cannot fail to arrest the attention of all of us interested in this department. This fact is the more striking when we consider that, while in one department, and that one of the most important, abdominal surgery, antiseptics properly so called are to say the least superfluous, in another, viz., obstetrics, they are not only useful, but essential. It is an unquestionable fact that the introduction of antiseptics and the careful and straightforward application of them constitutes the greatest stride in midwifery since the introduction of the forceps. I question if the adoption of antiseptics in midwifery is not the most successful practical achievement of modern medicine. Whatever may be the exact explanation of the proved uselessness, not to say absolute danger of antiseptics in abdominal surgery,—and to those who are desirous of pursuing this question I refer them to Mr Tait's remarkable essay in the *New York Medical Journal*,—the fact remains that their adoption in obstetrics has been as sure as the results have been remarkable. You are all familiar with the ravages puerperal fever used to make in our hospitals. Every one knows that at one time a mortality of 15 to 20 per cent. was by no means uncommon.

Epidemics of puerperal fever in Germany, France, London, and Dublin are facts with which the most superficial student of obstetrics is well acquainted. In no department of medicine has septicæmia run such wanton riot. Will any one dare to say that antiseptics have not entirely and absolutely revolutionized all this? How else explain the recent history of such hospitals as those in Paris, Prague, Copenhagen, London, and Edinburgh, where as a matter of fact the disease has been practically stamped out. I doubt if there is a more striking practical fact in the whole history of medicine than that in the hospitals I have just mentioned, where, without any external or internal change in the hospitals except the introduction of antiseptics, the mortality should have fallen from 20 per cent. to almost *nil*. Not only have antiseptics almost entirely annihilated puerperal fever, but they have rendered maternity hospitals, against which there has been and still is an

outcry, practically as safe as private dwellings. It remains for some Fellow of this Society to confer a lasting boon on the Maternity, by placing this fact as fairly before the non-professional public as the converse has been, and remove the stigma which has always attached to lying-in hospitals. To many of the Fellows of this Society abdominal surgery has but a limited interest, but to every Fellow the question of puerperal septicæmia is one of the deepest concern; and the victory won by antiseptics over our direct foe is matter for which the author of the system, Sir Joseph Lister, deserves the thanks of every practitioner of the art.

Among the moot points which present themselves to the practical obstetrician at the present time, there is one which I honestly believe will require to be faced by this and similar societies sooner or later. It is a subject upon which I desire to speak with reserve and circumspection. I refer to the growing prevalence in our country of artificial interference with the propagation of the species. That this is the case to an enormous extent in all classes of society is a fact beyond any kind of dispute. It is a question which strikes at the root of our social system, which, to a very considerable extent, affects the morals of our people, and which is the undoubted cause of many functional and organic troubles amongst women. The question is one which has been by no means settled by our profession. Such practices have at least the tacit sanction of many; others put the matter aside as Malthusian doctrine, apparently not at all sure whether Mr Malthus were a charlatan whose doctrines were scandalous and not fit for discussion, or a scientific man whose theories were too recondite for the average intellect. As his biographer says, "Malthus was the best abused man of his age. He was denounced as a man who defended smallpox, slavery, child-murder. He was assailed as a man who was hostile to soup-kitchens, early marriage, and parish allowance; who had the imprudence to marry after preaching against the evils of a family; who thought the world so badly governed that the best actions do the most harm; who, in short, took all romance out of life, and preached a dull sermon on the thread-bare text, "Vanity of vanities, all is vanity." The work of Malthus was second in importance only to that of Adam Smith's, and his work on over-population stands in the same relation to over-population as that of Smith's *Wealth of Nations* does to free-trade.

Not that Malthus's work can be classed with that of Adam Smith. The latter was the founder of a science, the science of political economy, in as real a sense as Newton was the founder of physical astronomy. To any one reading it must be evident that Malthus was not the man to found a science; competent judges, indeed, tell us that his Political Economy is far from a masterful work, and is remembered only from the fact it is by the author of the great essay on Population. Malthus's work, though

less original, was hardly less valuable, and consisted in the rediscovery of the forgotten truths insisted on in that essay. Malthus dealt with morals and philanthropy on their practical side. He had to do with political economy only because it is the science of a large part of man's happiness. The truth upon which he constantly insisted was, that the way to happiness lies through self-control; and whatever claims he has to be called a moralist and economist arise from his application of this truth not merely to the individual, but to the nation. Society, he insisted, "is master of its own fate." The neglected truth which Malthus brought to light may thus be stated:—

Population tends to grow indefinitely, and is in general restrained in its growth only through difficulty in obtaining food for its increasing numbers; for the production of food on a limited area cannot be indefinitely increased. Under favourable circumstances, population doubles itself in twenty-five years. In most countries food cannot be increased to meet the possible increase of the population, and the population must be kept down to the level of the food. There are only two ways in which this can be done, either the number of deaths must be increased, or the number of births diminished, as compared to what would be if the population had room to increase without limit.

The former is what Malthus calls the positive check, the latter the preventive check, when population is approximately stationary; one or both of these checks must be in action. Suppose the case of a country where population does not increase being kept down to the level of subsistence, and yet the number of births as great as in a population doubling in twenty-five years, it follows that the deaths will be due to want of food; they will be those chiefly of children dying from diseases caused by want of sufficient nourishment. In this the positive or destructive check acts alone. Suppose, on the other hand, the circumstance as to the supply of food the same, but the ways of the people such that the preventive check acts alone; the meaning of this is that the population will be kept within the limits of subsistence by diminishing the number of births, that men will not incur the responsibility of bringing children into the world without a fair prospect of being able to bring them up in health and comfort. Malthus's position was quite apart from the devices and arts such as I have already hinted at. What he in effect says is:—"Every desire has its proper place and proper gratification if we can find them. The passions are the materials out of which happiness is made; they are therefore to be regulated and harmonized,—they are not to be extinguished or even reduced in intensity. After the desire for food the desire for marriage is the most powerful and general of our desires. To say, therefore, that the desire for marriage is to be restrained and regulated, is not to treat it exceptionally

or deny its naturalness." The following quotation will show that Malthus, though wiser, was not colder than his fellows, although he did not marry till late, just before becoming a professor in India.

"When we contemplate the constant and severe toil of the greatest part of mankind, it is impossible not to be forcibly impressed with the reflection, that the sources of human happiness would be most cruelly diminished if the prospects of a good meal or a warm house and a comfortable fireside in the evening were not incitements sufficiently vivid to give interest and cheerfulness to the labours and privations of the day. Perhaps there is scarcely a man who has once experienced the genuine delight of virtuous love, however great his intellectual pleasures may have been, who does not look back to that period as the sunny spot in his whole life where his imaginations love to bask, which he recollects and contemplates with fondest regret, and which he would most wish to live over again."

The question of over-population and the misery and wretchedness which follow in its train is a gigantic one. Malthus contended for an earthly paradise, a large actual population and a state of society in which abject poverty and dependence are comparatively but little known,—a society, in fact, where moral restraint is perfect.

Many have assumed that there must be self-acting checks to population, the nature of which is not yet understood; but there is no sufficient ground for this belief. The only really self-acting check is want of food. The great destroyers of population history tells of are war, pestilence, famine. All these, however are ceasing to act. Wars now are not wars of extermination, and women and children are spared. Improved sanitary conditions and increased medical skill have, in great degree, checked pestilence. The increase of commercial facilities have made famine in civilized countries impossible. This, however, only hastens the time when the difficulty will be felt from increasing population. How to deal with such a matter does not fall to be discussed here.

Let us not, as a profession and as members of this Society at least, give any sanction to methods adopted by the laity, and connived at by many in the profession, of interfering with a normal function by means other than by self-regulation and control,—means which insidiously destroy virtue and sexual morality, and which, in the experience of any one who has paid any attention to the matter, are the cause of endless physical and mental ill-health to our married women. That under certain exceptional circumstances even these means are necessary and legitimate, most practical men must admit, and it is our duty as a profession to lay down a definite and clear rule for interference with conception as

now exists for the induction of abortion or premature labour. The question is, at all events, ripe for discussion.

Gentlemen, I have finished though not exhausted the subject, and thus very imperfectly discharged my last duty as your President. In vacating this chair, I heartily congratulate you on the choice of my successor, and I cordially welcome Dr Underhill to a position which the unanimous voice of the Society declares he is so well qualified to adorn.

Professor Simpson, in proposing a cordial vote of thanks to the retiring President for his excellent address, said that the Fellows were greatly indebted to Dr Croom for bringing forward a subject which obstetricians will shortly have to deal with.

Dr Connel, on behalf of the country members, had great pleasure in seconding the motion. Practitioners in towns had probably larger experience of the incidence of such morbid social conditions as the President had referred to, but the solution of the difficulty did not lie with them alone. In all efforts after reform, legislative and otherwise, it was apt to be forgotten that each man had only his own temptation to bear, and no law could add to or remove his personal responsibility. A former distinguished President, Dr Matthews Duncan, had, in a recent introductory address, inculcated upon students the practice of virtue as their first and highest aim. He (the speaker) thought that this lesson must continue to be impressed upon all alike. As family advisers they had immense unseen influence, and the best help they could give the community was in developing and intensifying the moral sense—on this ground, if on no higher—that the practice of virtue was also the best applied science, and, in fact, the physiological key to good health. It was not the young practitioner only who had to be reminded that his duty was to abjure and detest anything which swerved from rectitude in these matters; and that, except in the exercise of self-denial and of a robust morality, the public should have no help or countenance from the medical profession.

Dr Underhill, the President-elect, then took the chair, and thanked the Fellows for the high honour they had conferred on him in electing him President.

II. MITRAL STENOSIS AND THE THIRD STAGE OF LABOUR.

By D. Berry Hart, M.D., F.R.C.P.E., Lecturer on Midwifery and Diseases of Women, Surgeons' Hall, Edinburgh; Assistant Obstetric Physician, Royal Maternity and Simpson Memorial Hospital, Edinburgh; Assistant Gynæcological Physician, Royal Infirmary.

Pregnancy with stenosis of the mitral valve forms one of the most serious cases in Obstetrics. Not only does the pregnancy

exercise the most unfavourable effect on the heart, bringing the patient in a few months to the most advanced stage of cardiac disease, but we find also, on the completion of the third stage of labour, a most alarming condition often supervening, a condition that may speedily be fatal.

This important complication has been most ably brought before our Society by one whose death we all so much deplore—Dr Angus Macdonald—in his work on *Chronic Heart Disease in Pregnancy and Parturition.* I have no intention of taking up the question of mitral stenosis in all the aspects considered by him, but merely wish to direct your attention to its connexion with the third stage of labour. Since studying Dr Macdonald's monograph, I have seen several instances of the complication, about eight in all. Three of these I purpose bringing briefly before you to-night, the more especially as in one of them a post-mortem was obtained and an important condition of the heart found. Of these eight, seven died; this shows how serious this condition is. The cases are briefly as follows:—

Case of Abortion complicated with Mitral Stenosis. (Report by Dr Mackness.)

Mrs S., age 27; fourth pregnancy.

Previous History.—Her first child died when 9 months old. Some years ago she consulted Dr Angus Macdonald, who told her that if she became pregnant again she would probably die as a result; since then she has had two children, one of which is dead, and the other alive, being 3 years old. No trouble with any of the labours, except that she stated that, as a result of mismanagement of the last one, she has always had some uterine trouble, the nature of which was not ascertained.

Present Condition.—She is about four months pregnant; has been perfectly well; she has had a troublesome sore throat and some falling out of the hair, but no other signs of syphilis, and the living child is quite healthy. On 2nd September she went to the theatre, and got rather severely crushed in the crowd, causing some faintness. On 3rd September she became suddenly faint, and felt some pain in the abdomen. On 4th September she had several fainting attacks during the day, during which her husband states that her lips became very blue; a medical man was called in, and prescribed some mixture (nature unknown); he saw her again next day, and told her that she was going to abort, advising her to send to the Maternity for assistance. On the afternoon of 5th September Mr Booth saw her, and states that she had had some hæmorrhage about two hours before, losing about ʒij. or ʒiij. of blood; this had then ceased, however; there was some slight pain on pressure in the right side of the hypogastric region, extending into the right iliac region; there were no pains; during

the morning she had been vomiting, and was very weak. The case was treated as one of threatened abortion; gr. xx. of chloral hydrate given, and she was told to keep in bed; at 10 P.M. she was found to have slept a little; there had been no further hæmorrhage or pains, but she complained of flatulence; Pulv. Glycyrrhizæ Co. was ordered. On 6th September she was in much the same condition; she had taken castor oil in the morning, but had vomited it again; the abdomen was a good deal distended, the percussion note being tympanitic all over nearly; liver dulness about 5½ inches below costal margin; urine was high-coloured and scanty; tongue flabby, and covered with fur. During the night she was extremely restless, and suffered from vomiting and a great desire to go to stool. On 7th September she was a good deal better when the husband went to his work at 8 A.M.; at about 8.20 she became very faint, and an old woman who was called in is stated to have passed her finger into the womb and removed something; she became much worse, and I saw her for the first time at about 12.15 P.M. At this time she was apparently moribund, lying on the bed almost unconscious; she could not be roused to answer any questions; pulse about 140, very irregular, and almost imperceptible at the wrist; on auscultation the heart's beat was very feeble, and no murmur could be detected; her face was livid and lips extremely blue; extremities cold and clammy; respiration rapid and shallow; extremely restless; pupils equal and moderately dilated; when told to put out her tongue she did so, and it was found to be coated with fur, and protruded slightly to the right side; there was no hæmorrhage and no pains. About ℥ij. of high-coloured urine were drawn off; it contained no albumen. Hot bottles were put round her, and ʒij. of brandy given every twenty minutes. On examining per vaginam the os admitted one finger, and the fœtus was felt in utero; there was some dulness over the right iliac region. At 1.30 the pulse had improved slightly, but the lips were still extremely blue and the extremities cold; a hot vaginal douche was given to try and set up uterine action. At 2.30 the condition was still the same; the pulse was only kept up by the frequent administration of brandy with hypodermics of ether; milk was also given every few minutes in small quantities; she was continually asking for something to drink. It was then decided to empty the uterus as far as possible; the fœtus was found in the vagina, and the os easily admitted two fingers; half the placenta was then removed, but her condition became so serious that it was decided to proceed no further; there was hardly any hæmorrhage; a uterine douche was then given. At 3 P.M. she became much worse, the breathing became more rapid, and the pulse weaker; the face was completely blue and livid. At 3.8 P.M. the breathing ceased, and she had a convulsion of a tonic character, the face being drawn and the arms extended, with the fingers also extended, while at the same time she became black in the

face. This then passed off, and at 3.10 P.M. the heart stopped beating.

Post-mortem was performed by Dr Bruce. As the body was considerably decomposed, and lying in a small room of a large tenement, only necessary examination was performed.

Abdomen.—No peritonitis; uterine appendages normal; uterus about size of a three months' pregnancy, and containing blood-clot.

Thorax.—Right side of heart completely engorged, and lungs œdematous. Heart found with marked mitral stenosis; recent ulceration on aortic cusps.

Comment on Case I.—This case was, unfortunately, seen too late by Dr Mackness. There was, however, mitral stenosis with some fresh endocarditis and sudden severe symptoms arising on the 7th, when the abortion was going on. Little blood seems to have been lost, and while the fit was probably due to fresh ulcerative endocarditis, as no albuminuria was present, the death seems to have been caused by the slow engorgement of the right heart and lungs. I regret now that venesection was not performed; but the fresh endocarditic lesion rendered the prognosis, if not hopeless, at least excessively grave. The effects of the engorgement seem to have been prolonged, a fact due probably to its not being a full-time labour, and thus the bulk of blood less.

CASE II. occurred in the Royal Maternity Hospital, and a careful record has been prepared by Dr J. W. Ballantyne, then Resident. This account he will lay before the Society, with careful sphygmograms made at the time. I may state, however, that on the completion of the third stage the pulse suddenly flickered, becoming almost imperceptible.

CASE III.—*Labour complicated with Mitral Stenosis, Justo-minor Pelvis, and Prolapse of the Cord.* (Report by Dr Mackness.)

Mrs W., age 26, iii.-para. Her two former labours had been instrumental ones, and at the first one she suffered from convulsions, the child being still-born; the second child died eighteen months after birth. She had never had rheumatic fever, and did not know that she had any cardiac lesion; she had been perfectly well during the whole pregnancy, except that for a fortnight before delivery she had noticed that on climbing the stairs she became rather breathless. Labour pains commenced a little before midnight on 3rd October, and she at once found difficulty in breathing, and soon was unable to lie down. About 3.45 A.M. a considerable quantity of liquor amnii escaped. At about 4.30 A.M. I saw her, and found a small woman of about 5 feet 3 inches sitting up in bed gasping for breath; pulse 120, fairly full, but very irregular; respirations 60 per minute; pains severe. Chloroform was at once administered, the patient half-sitting up at first; the os was found fully dilated, the head free at the brim, and a

large bag of waters; the diagonal conjugate was rather under 4¼ inches; the anterior lip of the cervix was considerably thickened; the membranes were then ruptured, and the sagittal suture found in the right oblique diameter, the small fontanelle just within reach anteriorly, while the anterior fontanelle could not be reached. High forceps were then applied with some difficulty, on account of the small size of the pelvis; as soon as the forceps were applied the cord was found to have prolapsed, and could not be kept up, but on account of the critical condition of the mother it was decided to proceed with the delivery. The child was delivered at 5.15 A.M. still-born, and could not be revived; the child was a small one. The placenta was delivered ten minutes after; very little blood was lost. After delivery the condition of the patient improved slightly; the pulse was fairly full, but still very rapid and irregular; the breathing was harsh, with numerous fine crepitations; the heart sounds were obscured by the breathing. The case was looked on as one of bronchitis, and treated accordingly with poultices and steaming, while some beef-tea was ordered and ℥ss. of brandy every three hours. 7 P.M.—Condition much the same; breathing easier, but she could not lie down in bed: she had passed no urine; discharge very slight. Heart sounds impure, but the murmur could not be timed. 10 P.M.—A distinct precordial thrill was noticed, and it was suspected that it was a case of mitral stenosis. Ordered ℥10 of Tr. Strophanthi every four hours; brandy to be continued also. Considerable œdema of hands and feet.

5th October, 10.30 A.M.—Breathing very much easier, and had improved with the first dose of Strophanthus; had had no sleep; pulse 120, moderately strong, and rather irregular; distinct presystolic murmur to be made out now over mitral area. 3 P.M.—Since last seen she had had a fainting fit, during which the lips became perfectly blue. Pulse fairly strong, but irregular; heart was thumping considerably. Owing to a mistake of the friends, 80 ℥ of Tr. of Strophanthus had been given in twelve hours. She was now ordered ℥5 of Tr. Strophanthi every four hours, and ℥ss. of brandy every three hours.

6th October.—Very much better; lying down in bed and breathing comfortably; œdema gone; passing plenty of urine. She remained in this condition until 8th October, when she was sent to Professor Fraser's Ward in the Royal Infirmary.

In review it will be seen that in all these instances the serious complications began on completion of labour. In case one, death resulted speedily; in the third there was temporary but great embarrassment; and in the second we had in a few hours pulmonary œdema and ultimately death. How are we to read these records? Briefly, the matter may be put as follows:—During pregnancy we have imposed on the heart the task of driving a larger bulk of blood through the ordinary circulation and an additional area formed by the enlarging uterus and placenta. For

this extra task the left ventricle of the heart normally hypertrophies. Mitral stenosis is in itself a serious cardiac disease apart from any pregnancy, inasmuch as the weak left auricle soon fails in its increased duty, the lungs become engorged, and the right side of the heart dilated. If the work of pregnancy, however, be added, then we get compressed into a few months, what otherwise might have taken years; so that at the beginning of labour we may get such failure of compensation that we have a dilated and weak left auricle, congested lungs, and a dilated right heart. When the labour is finished and free hæmorrhage does not occur, we get returned to the right side of the heart the extra amount of blood before accommodated in the uterine and placental sinuses. The right heart more or less speedily becomes distended and the lungs engorged, so that we may get death with over-distension of the heart, as in Case I.; great dyspnœa and threatened death, as in Case III.; or sudden pulmonary œdema, as in Case II. I am well aware that this view of the over-distension of the heart after the third stage has been disputed, and that it has been alleged that the abdominal veins can accommodate the extra amount of blood. This objection has always seemed to me absurd, inasmuch as it could also be made to prove that in a normal body the blood should not return to the right side of the heart at all. In this respect it resembles the Traube-Rosenstein theory of Eclampsia, which, as we know, when logically pursued, made Eclampsia one of the normal phenomena of parturition. The post-mortem in Case I. clearly demonstrates that even in an abortion, where there is little hæmorrhage, the right heart may become paralyzed from over-distension. How much more, then, may this happen in a full-time case!

The considerations I have already advanced have no mere theoretical interest, but are of the highest practical value. They lead us to the discussion of the important question of—How can we best treat such cases, especially in the Third stage of labour?

Of course it is our duty to discountenance marriage most strenuously in all cases of women with mitral stenosis. This goes without saying. Unfortunately, our advice is seldom asked, and when given, not very often followed; so that we get the problem before us of mitral stenosis and pregnancy—What is best now?

The only thing I do during pregnancy is to keep the patient at rest as much as possible, and administer tincture of strophanthus steadily when circulatory disturbance begins. I prefer it to digitalis, as it is a pure cardiac stimulant, and does not contract the small arteries as digitalis does. Digitalis, from its action on the arteries, tends to throw more blood into the venous system, and thus more to the right side of the heart. Strophanthus, on the other hand, gives us heart stimulus, and does not increase the work of the heart by contracting the arterioles. I am aware, however, that I am treading on debatable ground here, and ground

foreign to me. I can only say that strophanthus has given me distinctly better results than digitalis. During labour one must keep up the action of the strophanthus, and deliver as soon as possible, using chloroform as usual. But now comes the worst period, viz., the third stage, and the one that demands our greatest vigilance. The plan I advocate at that time is as follows:—

1. Give no ergotin.
2. Feel no alarm at even free hæmorrhage.
3. Be specially on the outlook if hæmorrhage is scanty.
4. If the circulation becomes embarrassed, as evidenced by irregular heart action or dyspnœa, then push strophanthus and dry-cup over the heart, as suggested by Dr Connel. Bleed the patient from the arm if the latter fail.
5. Even if all seem right, have the patient constantly watched for the first day.

This treatment is diametrically opposed to that of many. Spiegelberg, for instance, says that loss of blood is highly dangerous, even when it is lost *guttatim*. This is quite true in part. The *guttatim* loss is dangerous, but only because it is not a free one. To conserve blood in such cases is to overload, and perhaps paralyze the heart. My experience on this point is quite the opposite of Spiegelberg's. The worst case I ever had lost blood profusely and recovered. In those cases under my own full care I have acted on these principles, and lost only one case—the case where hæmorrhage was not marked, where all seemed well, and yet death occurred suddenly a few hours after I left her.[1]

The views advanced seem to me to place the retro-placental blood-clot and the gush of blood one so often has in a multipara when the placenta is separating, in a new light. I have no doubt many of us have felt that these two occurrences have been due perhaps to want of vigilance or skill in the management of the third stage. The retro-placental clot has no function in separating the placenta, but it and the occasional gush should be regarded as salutary, as getting rid of that extra bulk of blood which, if returned to the systemic circulation, might embarrass cardiac action even in a healthy woman. I do not wish to seem to think lightly of hæmorrhage, or to even hint that one is not to be most careful in attending to the third stage: I only state what I feel now, that in a normal case the blood-clot in the placenta and membranes, or the teacupful of blood lost in a single gush, is really better out of the patient's systemic circulation and heart.

I am specially indebted to Dr Bruce for examining the heart in Case I., and to Dr Mackness for his careful and unbiassed clinical records.

[1] The administration of ergotin seems to me dangerous, as tending to prevent hæmorrhage, and therefore should not be employed unless the hæmorrhage is too profuse, while undue conservation of blood adds to the heart's work.

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Spiegelberg. — *Midwifery — Sydenham Society' Transactions,* Vol. I., p. 522, footnote.

III. MITRAL STENOSIS IN LABOUR AND THE PUERPERIUM, WITH SPHYGMOGRAPHIC TRACINGS.

By J. W. Ballantyne, M.B., M.R.C.P. Ed., Assistant to the Professor of Midwifery in the University of Edinburgh.

The following case illustrates in a very striking manner the grave dangers which accompany a pregnancy, parturition, and puerperium complicated by serious heart disease, especially when the cardiac lesion involves the mitral valves. The case is further interesting from the circumstance that I was enabled to make a series of sphygmographic observations during the labour and puerperium, and to gather from them certain indications as to the condition of the circulation during these periods.

I shall first briefly narrate the clinical history, and then, secondly, proceed to analyze at some length the characteristics of the pulse-tracings which were obtained during the progress of the case.

M. B., a young primipara of 22 years of age, of medium height, and fairly well developed, was admitted to the Royal Maternity Hospital at 12 noon on 6th November 1884, having been, according to her own statement, in labour since 2 A.M. On interrogation she further informed us that her last menstruation had occurred about the middle of February, that she had first felt the child's movements in June, and that she had been quite well during her pregnancy. This last statement was found afterwards to be very far from the truth, and a physical examination proved that she must have been for many months in a most precarious condition. She had first menstruated at the age of 15, and the discharge, of medium quantity, had recurred regularly every 28 days, until the commencement of the present pregnancy.

On making a vaginal examination it was found that the membranes had ruptured, that the os uteri was about the size of a half-crown and dilating very slowly, that the head was presenting in the left occipito-anterior position, and that the pains were weak and ineffective. Auscultation over the abdomen revealed the fœtal heart beating in a position half-way between the umbilicus and the left anterior superior iliac spine, at a rate of 140 per minute, and being masked to some extent by a loud uterine souffle.

It was noted that there was marked subcutaneous œdema in the abdominal region, in the legs, especially at the ankles, and in the

eyelids. The face also was puffy, and there was venous congestion of several parts, well seen in the cheeks and in the lobes of the ears. The heart was found on percussion to be enlarged, and there was to be heard in the mitral area a distinct presystolic and systolic murmur. The patient passed a little urine, acid in reaction, dark in colour, having a specific gravity of 1019, and containing about 80 per cent. of albumen. There was some dyspnœa, and on examining the lungs moist and dry sounds were heard at various points, and there was dulness over both apices and bases.

The patient stated that she had never had rheumatic fever or scarlatina, but confessed that for many months past she had been much troubled by breathlessness on any slight exertion, had noticed that her legs were much swollen, and had suffered almost continuously from a bad cough and spit.

During the afternoon of 6th November she complained of sickness, and vomited several times, the labour meanwhile progressing very slowly. Tincture of digitalis in 15 minim doses was given every hour. She was very much exhausted, her breathing was rapid and panting, and her pulse small and feeble.

At 5.15 P.M. the os was found to be fully dilated, and the head descending slowly through the pelvic canal. The pulse was 100, and the temperature 98·8° F., while the respirations were rapid and shallow.

Dr Berry Hart saw the patient at 6 P.M., and, taking into account the exhausted state of the woman and the serious cardiac complication, advised the immediate application of the forceps, and the speedy termination of the labour by this means. The pulse was now 90 per minute, weak and thready, and the temperature was 98·2°. The patient was therefore anæsthetized, and the forceps (axis-traction) were with some little difficulty applied, and the child's head brought slowly through the vulva. It was now seen that the right hand of the child with the umbilical cord twisted round the wrist had been caught in the grasp of the right blade of the forceps, thus explaining the difficulty experienced in applying that blade. The shoulders and body were expelled by the natural efforts. The child was still-born, possibly on account of the incomplete prolapse of the right hand with the cord twisted round it, and although Schultze's method of resuscitation and other means were tried, they were all of no avail.

The patient, after the delivery of the child, was in a very weak state, so whisky, digitalis, and ergotin were injected hypodermically, and brandy was given by the mouth. The uterus contracted well, and the placenta was removed in forty-five minutes. The pulse was at this time 100 per minute, almost imperceptible at the wrist, and the respirations were 38 per minute, shallow and panting. The sphygmographic tracings obtained at this time will be described in the second part of this paper, but they showed a remarkably small and weak pulse, so more brandy and 40 minims of digitalis were given by the mouth.

There was very little if any hæmorrhage after the completion of the third stage. The patient's extremities were cold, so hot bottles were applied, and on auscultating over the lungs numerous fine crepitations were heard, therefore hot fomentations were ordered.

Professor Simpson saw her at 9 P.M., at which time the temperature was 97·8°, pulse 102, weak and thready, and respirations 38 per minute. A teaspoonful of brandy was given every hour, the hot fomentations to the chest were continued, belladonna plasters were applied to the breasts, and one ounce of Henry's solution and five grains of calomel given internally.

Twenty minims of digitalis were given every hour during the night, and at 11 o'clock she got a little sleep. At midnight the temperature had risen to 101°, the pulse was 104, and the respirations 40 per minute. The temperature remained high till 6 o'clock on the morning of 7th November, when it fell to 99°, the pulse being 95, and the respirations 35 per minute. At 9 A.M. she was feeling easier, but the condition of the lungs was unsatisfactory, multitudes of moist sounds being heard at all parts, and especially at the bases, expiration was prolonged, and the breathing harsh and rapid. The lungs were therefore in a state of great œdema. The hot fomentations to the chest were stopped, and Bow's liniment rubbed on over the back of the thorax. The brandy and digitalis were continued as before. The lochial discharge was small in amount. She had a motion of the bowels, and passed a little water of low specific gravity, containing about 50 per cent. albumen and blood, the last-named constituent probably coming from the lochial discharge.

On 8th November the temperature fell to 97·2°, the pulse was 92, and the respirations 35 per minute. Brandy was given once every two hours, and iron and digitalis thrice daily. She was passing her urine involuntarily, so it could not be measured, but its characters remained the same, with the exception that the albumen decreased in amount. The lung condition did not improve, there was an area of dulness at the back of the chest, and there were signs of bronchitis.

She remained in much the same condition for the next fourteen days. The temperature gradually rose, and then remained stationary at about 99·8°, and the pulse varied from 87 to 97; the respirations averaged 37 per minute.

On 22nd November, since the cardiac and pulmonary conditions had not improved, and as she could not get thorough medical nursing at the Maternity Hospital, she was taken to the Royal Infirmary and admitted to Professor Maclagan's Ward.

Notwithstanding the medical treatment there adopted, she died three days after admission.

Autopsy.—The following were the conditions found at the post-mortem examination made by Dr Byrom Bramwell on 26th November:—

Length of body, 61 inches; circumference round the shoulders,

33 inches. Body spare and pale, lividity and rigidity slight, œdema of face.

On opening the thorax it was found that the left pleural cavity contained between thirty and forty ounces of fluid pus, that the pericardial sac contained two ounces of thin, purulent looking fluid, and that there were traces of slight pericarditis. On opening the heart, the aortic orifice was found to be incompetent, as was also the orifice of the pulmonary artery; the cone diameter of the former was ·9, and of the latter 1·2. The pulmonary artery was healthy, but the aortic segments were thickened, and there were old vegetations on the valves. The right ventricle had a thickened wall, and the length of its cavity, which contained some thick blood-clot, was three inches. The mitral orifice had a cone diameter of ·6, and the tricuspid one of 1·4. The cavity of the left ventricle measured 3½ inches in length, and the wall ¾ inch in thickness. There were distinct old inflammatory thickenings on the mitral valves.

The left lung weighed 1 lb. 3 oz., and was covered with thick pus. It had the characters of a compressed lung, and on section a cyst was found containing clear serous fluid. The right lung weighed 1 lb. 4½ oz., was voluminous, at one part emphysematous, and showed very well the condition of brown induration. There was also bronchitis and at some parts solid œdema.

Each kidney weighed 5 oz. In the case of the left the capsule was smooth, and could be easily peeled off; the cortex was pale, and the cones congested. The right kidney presented the same appearances, and there were in addition traces of old infarctions.

The spleen weighed 6 oz., its substance was soft, and there were signs of infarctions.

The liver weighed 4 lbs., had the characters of the nutmeg organ, and was congested and also fatty.

The still-born child weighed 5 lb. 4 oz., the placenta 1 lb. 2 oz., and the cord was 22½ inches in length.

The case had, therefore, been one of mitral stenosis complicating pregnancy and labour. Compensation had failed, and the effects of backward pressure on the heart, lungs, liver, kidneys, and spleen had been developed. In addition, there was the empyema most marked on the left side, and we must also remember that the pericardial sac contained a little purulent fluid.

We may now proceed to consider the sphygmographic tracings obtained during the course of this fatal case.

Labour was in the first stage when the patient was admitted, hence no tracings showing the cardiac conditions during pregnancy were obtained. In another case of mitral stenosis which I saw only during the pregnancy, and in which death took place soon after the confinement, I obtained tracings during the gestation. One of these tracings is reproduced in Fig. 1; it was taken at the fifth month, and shows a small,

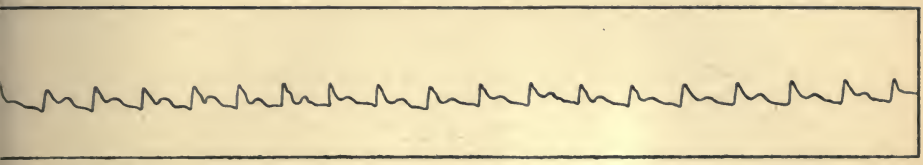
rapid pulse (108 per minute) with a well-marked dicrotic wavelet and a rapid descent from the apex, a tracing therefore indicative of low vascular tension. The cardiac hypertrophy set up by pregnancy has in this case caused a partial compensation to be established.

To return to the case of M. B., during the first stage of labour three tracings were made, and these were taken during the intervals between the pains, for at this time the pains were few, short, and far between. The pulse (*vide* Fig. 2) is seen to be a small one, but one of almost complete regularity. The heart is beating at the rate of 90 per minute. The upstroke is clearly enough marked, and there is no sudden emptying of the artery after the heart-beat. The pulse, then, is deficient only in amplitude. The heart is beating regularly although not powerfully, and the blood pressure in the arteries is well sustained during the cardiac diastole. It is in all probability a better pulse than that which existed during pregnancy, if one may be allowed to compare it with the pulse tracing seen in Fig. 1. This corresponds with what I have generally observed in cases of cardiac lesions complicating labour, namely, that during parturition and the early days of the puerperium the cardiac condition, as revealed by the sphygmograph, is considerably masked by the concomitant phenomena of labour and the lying-in period. The pulse tracings obtained in such cases during the first and second stages of labour and in the early days of the puerperium are more normal in appearance than at any other time in the course of the cardiac malady. I was unable in this case, I am sorry to say, to obtain any tracings during the second stage of labour, for I extracted the child with forceps very soon after complete dilatation of the os had been accomplished. Further, since chloroform was being administered, it is doubtful whether we could have drawn any conclusions from pulse tracings made then.

During the third stage, after the patient had recovered consciousness, three tracings were made in rapid succession. Here it must be noted that we must not place too much importance upon these tracings as means of judging cardiac conditions in such a case, for the patient had only just recovered from the effect of the chloroform, and had had a hypodermic injection of digitalis, ether, and whisky. Bearing these points in mind, we note that in these three tracings (Figs. 3, 4, and 5), taken in as rapid succession as was possible with the Dudgeon sphygmograph (probably only a few seconds intervening between the respective tracings), there is a very marked change in the character of the pulse-wave. The first tracing (Fig. 3) shows a pulse curve not unlike that seen in the first stage of labour; it is, however, slightly irregular, and the beats follow one another more rapidly (rate 102 per minute). In the next tracing (Fig. 4), taken immediately afterwards, the pulse in its rate is still the same, but it is now regular and the upstrokes are higher, whilst the lines of descent are more rapid. At this moment a uterine contraction occurred which probably expelled the placenta from the uterus, for I removed the after-birth from the

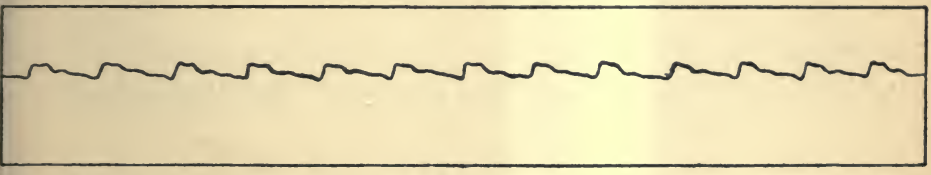
DESCRIPTION OF TRACINGS.

No. I.



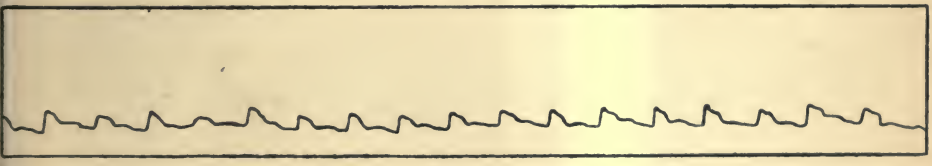
I.—Mrs F., pregnancy fifth month. Mitral stenosis. Rapid small pulse of low tension.

No. II.

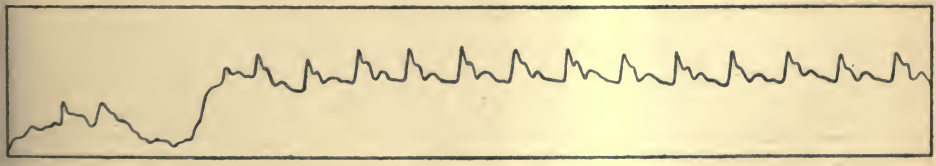


II.—M. B., labour, first stage, during an interval between pains. Presystolic and systolic mitral murmurs. Small pulse of almost complete regularity, 90 per minute, and of good tension.

No. III.



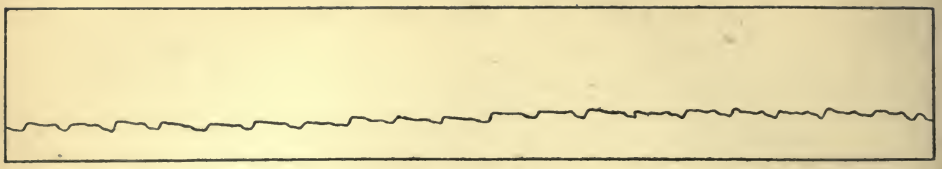
No. IV.



No. V.

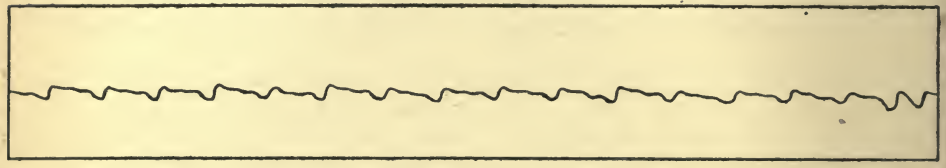
III., IV., and V.—M. B., third stage of labour. Three tracings taken in rapid succession, showing marked change in character of pulse-wave before, during, and immediately after the expulsion of the placenta.

No. VI.



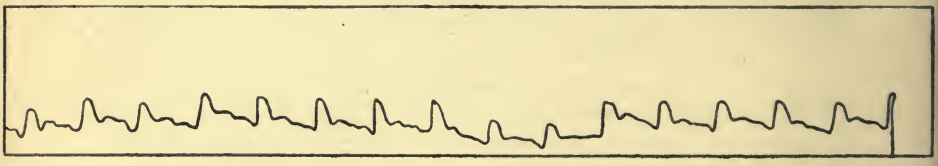
VI.—Tracing taken four minutes after completion of third stage.

No. VII.



VII.—Tracing taken five and a half hours after delivery; shows improved vascular tension.

No. VIII.



VIII.—Tracing taken at 12 noon of first day of puerperium. Rate 90 per minute, low tension, slight undulation of respiratory base line.

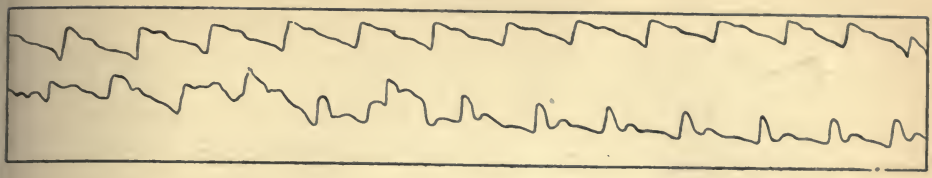
No. IX.

IX.—Tracing taken on evening of first day of puerperium during sleep of patient. Slight further improvement in character of pulse.

No. X.

X.—Tracing taken on second day of puerperium. Pulse slower, but still small.

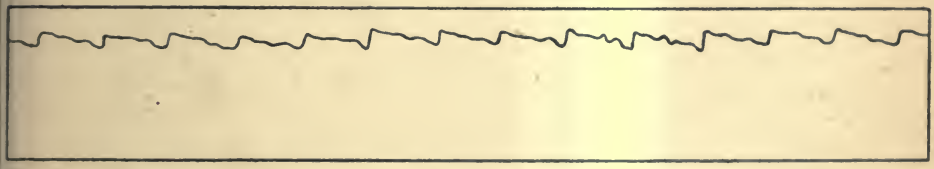
No. XI.



No. XII.

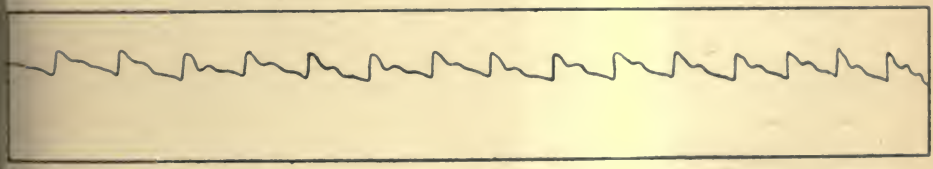
XI. and XII.—Tracings taken on morning of third day of puerperium. Remarkably normal-looking pulse curves. Rate 84. No. XI. shows also the effect of a cough upon the pulse curve.

No. XIII.



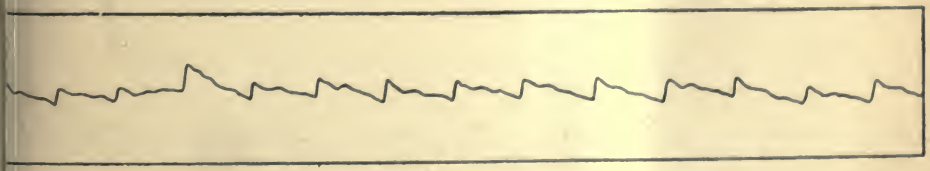
XIII.—Tracing taken on evening of third day of puerperium. Not so normal looking as Tracings XI. and XII.

No. XIV.

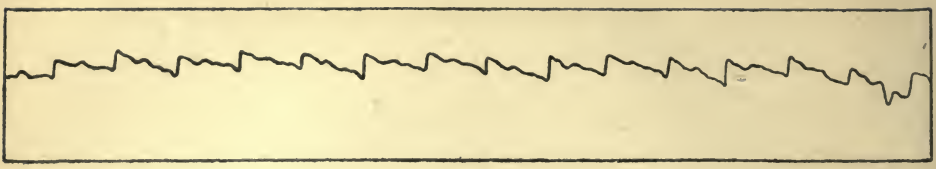


XIV.—Tracing taken on fourth day of puerperium.

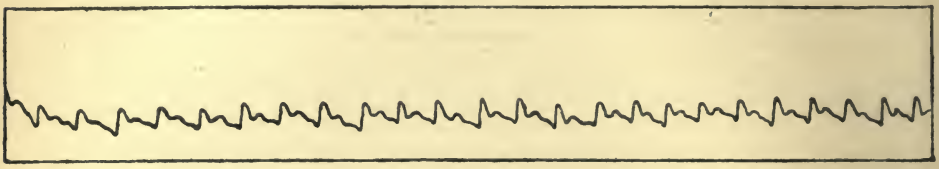
No. XV.



No. XVI.



No. XVII.



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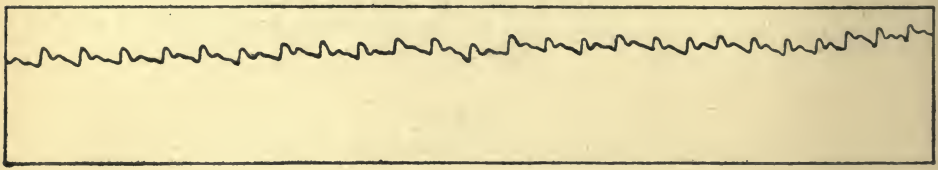

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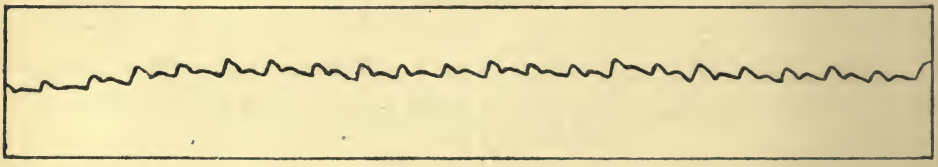

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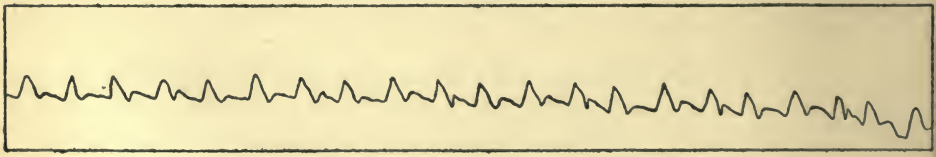

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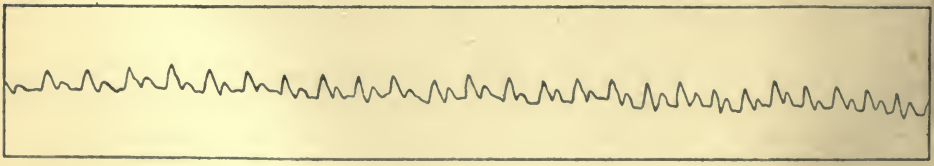


XV. to XXI.—Tracings taken during remainder of puerperium up to death on the twenty-first day after delivery. They show a steady increase in rapidity and a gradual development of discrotism and hyperdicrotism.

vagina immediately after taking the next tracing (Fig. 5). This tracing, then, was in all probability made immediately after the placenta was expelled into the vagina, and presented very alarming characters. In appearance it is totally different from Figs. 3 and 4. It is little more than a line with little irregularities of rise and fall. Ultimately it sinks entirely below the base line, the patient being almost pulseless at this moment. The heart, then, during the taking of this tracing was flickering in its action, and very nearly came to an absolute standstill; but from a study of these tracings alone, I do not think we are warranted in saying whether the condition was due to the heart being overfilled or to there being too little blood in that organ.

Four minutes afterwards the tracing represented in Fig. 6 was taken, and here we find the heart beating feebly but with perfect regularity, and at the rate of 108 per minute. The heart has in these four minutes regained its regularity of beat, but, as will be seen from the following tracings, it is not till the evening of the first day of the puerperium that the pulse curve assumes characters similar to those seen in the tracings made during the first stage of labour.

The patient was confined at 7 P.M., and at 1 A.M. three tracings were made, one of which is represented in Fig. 7. These all showed tracings similar to that depicted in Fig. 6, but manifested a considerable improvement in vascular tension. The pulse was therefore slowly regaining its tonicity. The pulse-rate was 96. At 12 noon two more tracings were made (*vide* Fig. 8) which differed but slightly from each other. The pulse was still nearly quite regular, and had a rapidity of beat of 90 per minute. The tracing showed a condition of low tension—the predicrotic wavelet was absent; but there was a slight undulation of the respiratory base line, due, no doubt, to the pulmonary œdema which was now manifesting itself.

On the evening of the first day of the puerperium we found similar pulse tracings (*vide* Fig. 9) which, however, showed a little further improvement in the state of the circulation. The respiratory undulations were still present. These tracings were made during the sleep of the patient.

On the second day of the puerperium we found a much slower pulse, varying in rate from 64 to 70 beats per minute. In this particular, therefore, the pulse was more normal, for in all normal puerperæ I have found a slow pulse. The pulse, however, was still small (*vide* Fig. 10).

On the third day of the puerperium five sphygmograms were made in the morning and four in the evening (*vide* Figs. 11, 12, and 13). These tracings were very remarkable, for they were indistinguishable from the normal pulse tracings which we are in the habit of finding in healthy women during the lying-in period. The pulse-rate was 84 per minute, the upstroke and the apex of the tracing were perfectly formed, and the downstroke sloped slowly towards the base line, and exhibited in its descent a

predicrotic and a small dicrotic wavelet. There were no respiratory undulations except in the tracing shown in Fig. 11, where the effect of a cough upon the pulse is demonstrated. The cause of this remarkably normal-looking pulse tracing on the third day of the puerperium was no doubt complex, for now the patient was lying perfectly at rest, was having frequent doses of digitalis, iron, and brandy, and the heart was having less work to do than at any time during the preceding months. I have observed that, in several cases of serious pulmonary, renal, and cardiac disease complicating labour, there was found a remarkably normal-looking pulse tracing during the early days of the puerperium.

On the fourth day of the puerperium, however, the pulse tracing began to lose its good characters (*vide* Fig. 14), and during the days following the tracings showed a steady increase in rapidity of beat, and there was a gradual development of the dicrotism which culminated, in the last tracing made before the death of the patient, in occasional hyperdicrotism (*vide* Figs. 15–21). During the period between the fourth day of the puerperium and the death of the patient seventeen tracings were made, but these need not be considered individually, for they all showed a steady downward tendency. I have obtained tracings very similar to that shown in Fig. 21 in cases of septicæmia, and this coincidence is, I think, explained by the presence of pus in the pleural and pericardial sacs.

The whole case is a very instructive one of mitral stenosis complicating labour and the puerperium. The tracings show that immediately after the expulsion of the placenta there was a period of great danger, as evidenced by the tracing shown in Fig. 5; but they do not of themselves show what the cause of the heart's failure at this time was, but they are quite explainable if we suppose a heart overdistended with blood and acting in a feeble, flickering manner; at the same time an almost empty heart struggling to expel the small quantity of blood contained within it might have given similar tracings.

Dr Berry Hart has, however, laid before this Society the record of a case similar to the above where the patient died, and where on making a post-mortem examination the right side of the heart was found to be over-distended with blood. Taking, therefore, the two cases together, we find considerable evidence in favour of the theory of the cause of death in cases of mitral stenosis complicating labour which Dr Hart so strongly supports. The evidence also seems sufficient to justify us in trying the treatment which Hart proposes, namely, blood-letting, to relieve the engorged heart.

These sphygmograms further show that during the early part of the puerperium the patient was in a much better condition as far as the circulatory apparatus was concerned, and might possibly have been saved had not pulmonary œdema and emphysema set in, and proved fatal nineteen days after the patient was admitted to the Maternity Hospital.

Dr Halliday Croom said that in 1872 he met with a labour complicated with mitral stenosis, in which the lesion was severe. Since then he had specially watched these heart cases, and had met with a very considerable number of them, and his opinion was that the question of heart disease in pregnancy was not put straight, that it depended on the degree of the lesion, and that, with the exception of stenosis, they must not lay down hard and fast rules. He thought Dr Hart's theory was feasible. It was both serious and unnecessary to give strophanthus all during pregnancy. Cardiac cases died from complications such as pneumonia, and not from the result of heart disease. Patients might go through successive pregnancies with safety even with very pronounced cardiac disease. Dr Hart's treatment, he thought, was on excellent lines, and admirably met all the symptoms likely to present themselves.

Dr Foulis asked if strophanthus had no action on the arterioles?

Dr Craig said that Dr Fraser had proved that the drug had no action on the arterioles; at the same time, Dr Craig did not think that it would be advisable to give strophanthus in full doses for any length of time.

Professor Simpson sympathized with Dr Hart in having had to treat such cases. Professor Simpson's experience had been similar to Dr Croom's. In the Maternity a case of mitral stenosis with aortic regurgitation had been under his care, and recovered. They must notice that a new element might be present, as the ulcerative endocarditis which occurred in Dr Hart's first case. No one with mitral stenosis could bear strain, and pregnancy was a strain. Dr Hart's communication was most useful in regard to treatment. Professor Simpson would not be afraid to give small doses of strophanthus during pregnancy; he thought it a sensible suggestion.

Dr P. A. Young asked if all Dr Hart's cases were Maternity patients? because in poor people they had to take into account the surroundings, improper nourishment, etc.

The President said it was important to remember that Dr Hart's paper treated only of mitral stenosis. Other lesions were different. Having seen one case of pregnancy and labour in a patient affected with bad mitral stenosis, he would not like to see a repetition. He would not advise marriage in those affected with stenosis. When Spiegelberg said that loss of blood during labour would be serious, he probably thought of aortic regurgitation. In stenosis the loss was an advantage. He attended a lady, aged 40, who during pregnancy experienced great discomfort, but found benefit from digitalis. During labour he treated her according to the lines laid down by Dr Macdonald, viz., he delivered as soon as the os was dilated, and did not give ergot, but allowed her to bleed in order to relieve to some extent the distended auricle. The danger lasted for an hour and a half after labour. The patient had been liable to pulmonary congestion ever since.

Dr Foulis said that mitral stenosis was essentially an obstructive

disease. The great organs of elimination became congested, possibly albuminuria might be chronic, and, being aggravated by pregnancy, as a result endocarditis, pleurisy, etc., might supervene. They all knew how powerful bleeding was in relieving puerperal fits in albuminuric disease. When albumen was present hæmorrhage was useful to relieve the congested organs. He had seen a case of mitral stenosis pass through pregnancy safely. In every case of mitral stenosis the urine should be carefully examined throughout pregnancy.

Dr Connel pointed out the value of dry cupping, and said he would never hesitate to try it before proceeding to venesection.

Dr Freeland Barbour said the subject was only advanced by the post-mortem examinations, and by the sphygmographic tracings giving a record of the heart clinically. He had seen one case in which the patient died on the eighth day of the puerperium; at the post-mortem examination fresh vegetations were found on the mitral valve. The labour passed off well, but on the third day the pulse became very rapid, and œdema of the lungs set in. The urine was albuminous. One factor must be taken into account, viz., the sudden fall in intra-abdominal pressure from the removal of the bulk of the pregnant uterus. The effect of removal of intra-abdominal pressure was seen in the difficulty which there was in expelling the placenta, and in emptying the bladder after labour. It must also have an effect on the circulation by favouring engorgement of the abdominal veins. Dr Hart had not sufficiently proved that syncope following immediately on emptying of the uterus was not due to dilatation of the veins of the abdomen.

Dr Wood asked if Dr Hart would give strophanthus where compensation was established?

Dr Berry Hart thanked the Fellows for their reception of his paper. Dr Halliday Croom took a most favourable view of this lesion in pregnancy; but it must be remembered that, apart from the additional strain imposed on such cases by pregnancy, there was also risk of fresh endocarditis, and he himself therefore was totally opposed to women with mitral stenosis marrying. Dr Craig seemed doubtful about the continued use of strophanthus; he had used it in one case without intermission for three months at the end of pregnancy with great benefit. Of course, he only began it when compensation was failing. It was now known that digitalis might be employed for years even without risk, so long as the flow of urine did not diminish—(G. W. Balfour). Dr Foulis seemed to attach more importance in such cases to the albuminuria present. Albuminuria was secondary in heart cases, never gave rise to eclampsia in his experience, and was not to be confounded with deficient excretions of urea. Dr Connel's suggestion to dry-cup before venesection was very good. Dr Ballantyne's paper was valuable, and he agreed with him as to his caution in deduction from sphygmographic tracings. Dr Hart based his views, not on them only, but on the case of the greatly distended right heart in

one of the deaths. He could not agree with Dr Barbour's view as to the possibility of the heart being nearly empty of blood, and the abdominal veins distended owing to the fall in intra-abdominal pressure. If this were the case, how could one get the rapid congestion and œdema of the lungs so often one of the sequelæ? Besides, the women were cyanosed and breathless, not pale and faint, as they would be if the view Dr Barbour supported were correct.

MEETING II.—NOVEMBER 9, 1887.

DR UNDERHILL, *President, in the Chair.*

I. *Dr Foulis* showed his AXIS-TRACTION FORCEPS in a modified form.

II. *Dr Brewis* showed—(*a*), A SMALL MYOMATOUS TUMOUR OF THE OVARY, which he had removed from a patient 36 years of age. The tumour was found on microscopic examination to be made up of bundles of fibres, composed of spindle-shaped cells with a large oval nucleus. (*b*), UTERINE APPENDAGES affected with HYDROSALPINX. Both Fallopian tubes were distended from obstruction, caused by the fimbriated extremities having become adherent to the ovaries. On the right side the tube was distended to the size of a man's fist. (*c*), CIRRHOTIC OVARIES. (*d*), OVARIES affected with CYSTIC DEGENERATION.

III. *Dr Halliday Croom* showed—(*a*), AN EXTRAUTERINE FŒTATION. A woman, 28 years of age, and had given birth to four living children. She was two months pregnant; was taken ill on the 28th of July 1886 with acute pain in the right hypogastric region, followed by collapse. On examination per vaginam there was a prominent fluctuating swelling in the pouch of Douglas. The collapse was most marked. Abdomen much swollen and very tender. Ammonia in half-drachm doses of compound spirits was given for 12 hours, and she completely rallied. On fifth day she was quite well, except for a feeling of bearing down and desire to defecate. On sixth, she got up and went downstairs. She made frequent ineffectual attempts to defecate. She remained comparatively well, and discharged her ordinary duties for six days. The collapse returned, with symptoms of fresh internal hæmorrhage, and the patient died.

Measurements: A. External.—Whole mass measures 5 inches in breadth. Uterus proper—length, 3½ inches; breadth, 2¼ inches. Gestation sac—vertically, 2½ inches; circumference, 7 inches. *B. External.*—Uterine cavity 3 inches long, 1¼ inches broad at fundus. Uterine wall ⅛ths of inch thick.

Description.—On looking at mass it at first appears to be an interstitial pregnancy, but on closer examination, on anterior surface is seen a distinct sulcus, which divides it into two unequal parts. On the inner edge of the sulcus is inserted the right round ligament, showing that sac is separate from uterus proper. Uterine cavity is filled by an entire decidua, which in no way communicates with the gestation sac, while the opening of the right Fallopian tube can be made out, showing a dilatation of the interstitial part of the tube, sufficient to allow of the passage of a No. 9 bougie. The gestation sac is contained in the isthmus of the right Fallopian tube, the distal extremity being found undilated, and measuring 2½ inches long. Rupture seems to have taken place at the outer and upper parts of the sac involving the broad ligament.

(*b.*) AN AMPUTATED UTERUS from a case of complete inversion, with FIBROID TUMOUR.

(*c.*) DOUBLE DERMOID CYST.

(*d.*) BLOOD CYST from the BROAD LIGAMENT, which was found lying free in the abdominal cavity.

IV. *Mr Lawson Tait* showed TUBES and OVARIES removed for DOUBLE PYOSALPINX. The following is an account of the case:—A. S., æt. 25, married five years, four children, youngest fourteen months; menses always irregular, profuse, accompanied by great pain, and generally lasted a week; last catamenia three weeks ago, lasted a week. Present illness began fourteen months ago, after confinement; has been in almost constant pain ever since; in bed best part of her time; had a constant discharge. Went into Guest's Hospital, for the first time, four months ago; in bed there six weeks; discharged, but no better; in bed at home seven weeks suffering intense pain. Went into the hospital again a month ago; was then discharged in a fortnight, as the doctor told her her case was quite hopeless, nothing could be done for her. At home a fortnight, and then sent to Mr Tait by Mr Bradley of Dudley. The case was regarded as malignant, but an exploratory excision revealed it to be a case of double pyosalpinx. The appendages now shown were removed, and the patient recovered easily.

V. *Mr Lawson Tait,* in opening the discussion on Dr Berry Hart and Mr J. T. Carter's paper on EXTRAUTERINE GESTATION, said—As I have already stated in communication to the Pathological Society, I do not think it is possible to over-estimate the value of the paper by Dr Berry Hart and Mr J. T. Carter on the results of the examination of frozen sections of the two cadavera in which advanced uterine gestation was observed.

The views which I advanced concerning the pathology of extra-uterine pregnancy, so long ago as 1873, have been entirely confirmed by facts that I have since seen in the operative details of this con-

dition. But the misfortune of the operation is that they are witnessed by few people, and in such cases as those in which the operation is performed at the time of early rupture the details are not perceptible to any one except the operator. It became, therefore, a matter of the utmost difficulty to persuade my professional brethren of the accuracy of my views, and except that they were always alluded to in writings on the subject, seemed to make very little impression. Dr Berry Hart's observations have completely proved the accuracy of the views which I had about this peculiar displacement. Briefly stated, what I regard as the true pathology of extrauterine pregnancy is as follows:—In the first place, one or other, generally both, of the Fallopian tubes are so damaged by inflammatory change—desquamative salpingitis—that the procreative machinery is put out of gear. My belief is that the chief function of the cilia of the Fallopian tubes is to prevent the access of spermatozoa, and that, therefore, impregnation takes place only in the tubes when deprived of their cilia. Adhesion of the impregnated ovum then takes place to the wall of the tube instead of the wall of the uterus, and then the ovum develops until the tube can no longer expand. Between the tenth and thirteenth week the tube gives way, and upon the position of the point at which the rupture takes place depends the variety of extrauterine pregnancy which is developed. By far the most common seat of rupture is out through the surface of the tube into the cavity of the peritoneum, because the proportion of the circumference of the tube which is covered by peritoneum is very much greater than the proportion of the circumference of the tube which is related to what is called the cavity of the broad ligament. This rupture into the peritoneum, so far as we can tell, is fatal in an enormous number of instances. What the proportion is we cannot say, but it looks to me as if it were 90 or 95 per cent. Enormous sinuses are developed in the tube and in the mass of the placenta; these are torn, they bleed, the hæmorrhage is recurrent, and the patients die of hæmorrhage into the cavity of the peritoneum, forming the variety of "intraperitoneal" hæmatocele, or they die later on of purulent peritonitis.

No doubt some of the cases must end by death of the ovum, without much hæmorrhage, the fœtus and placenta becoming absorbed, but it is perfectly clear that in these cases the tube will remain functionally useless because it has been sealed, probably at both ends, by inflammatory disturbance, and therefore will be a perfectly useless organ. So far as we know, in the whole realm of surgical literature there is only one case in which there is the least evidence of what may be called an abdominal pregnancy going to the full time, that being Mr Jessop's case. Even that case is open to the view that it would have been one of the other variety, in which the walls of the ovum cavity and the posterior layer of the broad ligament ruptured just at the last moment, and the child was found in the cavity of the abdomen. At anyrate, except this one case, there is no evidence at all of any instance in which the ovum has been, or

the child has been, developed inside the peritoneal cavity. In fact, considering the enormously active digestive powers of the peritoneum, the likelihood of the occurrence of such an incident would be very small. The second form of rupture into the cavity of the broad ligament, on the contrary, forms a condition which is, so far as I know, never fatal, or only rarely so, one instance alone having been placed on record in which death has taken place from the hæmorrhage. In that case the fatal issue was doubtless due to the rupture of the cyst into the cavity of the peritoneum, so that really the exception is an example of the rule being proved. Doubtless in many of the cases of this variety the ovum dies at once or is absorbed like an ordinary broad ligament hæmatocele. But in other cases the ovum does not die, but goes on developing to the full time—death, however, occasionally interfering with the progress of the pregnancy at the fourth, fifth, or sixth month. Then we have the group of cases in which, after suppuration has taken place, the bones of the fœtus are discharged through the rectum, through the bladder, or through Douglas's cul-de-sac into the vagina. Many instances of this have occurred in my practice, as also have cases in which a lithopædion is the result. Such a lithopædion probably would have resulted in Dr Berry Hart's first case. The minority of the minority proceed to the full time, and are removed either as living or as dead children. Examples of both I have published at the full time. They are removed from a cavity which Dr Berry Hart proves completely is extra-peritoneal. This last view was what I based all my conclusions upon, that these full-time extrauterine pregnancies were entirely extra-peritoneal, the only place in which they could be was the cavity of the broad ligament, and therefore I concluded that they were due to a rupture from the Fallopian tube into the cavity of this structure. Dr Berry Hart's two preparations absolutely establish the justice of this conclusion. One remarkable thing about Dr Berry Hart's section is worthy of notice, because it explains completely the only difficulty which I found in the whole thing. That is, that whilst the peritoneum is lifted right off the pelvis all round the organs contained in it, in every direction but one, it is not lifted from the anterior surface of the uterus. We have, therefore, a prolongation, like the finger of a glove, of peritoneum curving down in front of the tumour, although reaching as far as the fundus of the uterus into the base of the bladder; on either side of this it is completely lifted. This explains what puzzled me greatly in two instances of my operations, that opening in the middle line I had to close the cavity of the peritoneum after having passed through both its anterior and posterior layers. These observations of Dr Berry Hart, as I have already said, completely establish my views of the pathology of extrauterine pregnancy, and these views of themselves enormously simplify at once the pathology and surgery of the condition.

Professor Simpson said, that owing to his absence during Mr

Lawson Tait's remarks he felt at a loss as to how to proceed, but was sure that all were agreed as to the value of the preparations, explanations, and deductions brought before the Society in the able paper of Dr Berry Hart. Dr Hart had done important service in establishing the existence of sub-peritoneo-abdominal gestation, and in showing how it develops. It was satisfactory to get such a clear demonstration, and he thought Dr Hart had done wisely in not speaking too strongly as to the impossibility of the occurrence of the other forms of extrauterine gestation, such as the ovarian. Prof. Simpson did not doubt that the ovarian variety did exist. The demonstration that the ovum develops in the tube and ruptures into the broad ligament is an important one. Professor Simpson once saw such a case along with Dr Craig; on opening the abdomen it was found to be full of blood, on clearing out which a rent was discovered on the posterior aspect of the left broad ligament communicating with a tubal pregnancy bursting into the loose tissue between the layers of the ligament. The hæmorrhage was arrested, and the peritoneal cavity cleansed, but a general peritonitis had already been set up, and the patient died.

Dr Halliday Croom said he must rise and thank Dr Hart and Mr Tait for what he had learnt to-night. A patient, on whom he performed ovariotomy lately, had shock in the evening, which was followed by a swelling in the abdomen and such collapse that he thought she must die. However, she rallied, and it was Dr Croom's opinion that she suffered from expansion of the broad ligament by blood. In like cases diagnosis is very difficult, as the patients are seen during collapse. As an example of this difficulty, Dr Croom mentioned a case in which the patient had missed a period, and on stretching up to a shelf was suddenly seized with pain, followed by shock, and the development of an abdominal swelling. He thought it was impossible to diagnose such a swelling to be an intrauterine hæmatocele or an extrauterine gestation, and he asked Mr Tait if he would operate as readily for one condition as for the other.

Mr Tait said that if the patient looked seriously ill he would operate without minding diagnosis. In one case of extrauterine hæmatocele he opened from the vagina and drained. In such cases you can never be sure of your diagnosis.

Dr Freeland Barbour showed a specimen of EXTRAUTERINE GESTATION, and gave the following history of the case :—The patient when between two or three months pregnant, suffered from hæmorrhage, at which time she was supposed to have aborted. Between the third and fourth month pelvic inflammation following abortion was diagnosed. Between the fourth and fifth month pregnancy was undoubted, and at this time the diagnosis made was pregnancy with fibroid tumour. Between the sixth and seventh month the diagnosis of extrauterine gestation was made. The case went on to full time, labour set in, after which the pains and the fœtal

movements ceased. Two months afterwards abdominal section was performed by Professor Simpson, but the patient did not rally. The following are the clinical points :—The fœtal movements were accompanied with great pain, which made her shriek out; after labour pains came on the fœtal movements stopped and also the pains. The post-mortem examination was performed by Dr Bruce. The sac is composed of omentum and transverse colon; there is no trace of membrane forming the sac wall. Dr Barbour is at a loss to account for the absence of the membranes. The fœtus was lying in the peritoneal cavity, and below there was a mass, evidently extra-peritoneal, which was perhaps the placenta.

With regard to Dr Hart's paper, he thought Dr Hart had made a landmark in extrauterine gestation. He must, however, take exception to the remark that you don't get ovarian or abdominal pregnancy. The points showing that pregnancy is not tubal are, that the gestation sac must be in the position of the ovary, the ovary must be absent, ovarian tissue must be found in the sac, and lastly, the Fallopian tube must be present intact.

Dr Keiller, in regard to the case mentioned by Dr Barbour, said that some time ago the patient came in a cab to his house complaining of profuse hæmorrhage. The patient appeared pregnant, and evidently came with the idea of getting something to rid her of the pregnancy. Dr Keiller ordered her home, advising her to lose no time in sending for her usual medical attendant. Some months afterwards she again came, and informed him that she was pregnant, and that she was now anxious to get his opinion as to her exact condition. He now ordered her to go to the Maternity Hospital, where extrauterine gestation was diagnosed, and abdominal section performed; but, as Dr Barbour had stated, and as the interesting preparation now exhibited proved, without a successful result. Dr Keiller stated that he had come to the Society on the present occasion to hear his old friend Lawson Tait, in whose opinion he now more than ever agreed, as to the propriety of opening the abdomen in extrauterine pregnancy cases before the patient is too far gone, and that irrespective of the correctness of the diagnosis, which was often doubtful.

Dr Foulis objected to Mr Lawson Tait's view as to the function of the cilia lining the Fallopian tube. He could not believe that they had any other function than to drive on the ovum into the uterus after it had entered the Fallopian tube. Mr Tait must allow that cilia in all other parts of the body carry fluids, &c., onwards in the direction of their lashings. Nor could he accept Mr Tait's view that it is the function of cilia to prevent the seminal fluid getting into the Fallopian tube, and that it is only when the cilia have been destroyed by desquamative inflammation that the ovum can be fertilized by the seminal fluid in the tube. He rather held the view that the only function of the cilia is to pass the ovum onwards into the uterus, and that when these cilia have been destroyed, in whole or in part, the ovum is apt to stick

in the Fallopian tube, and may be there fertilized and grow *in situ*. In reading Dr Hart's paper Dr Foulis was surprised to find the following statement—"From the history of five months' amenorrhœa, and the occasional attacks of fainting and pain during that time, there was no difficulty in coming to the conclusion that we had to deal with an extrauterine gestation developing between the layers of the broad ligament." After what Dr Croom had just stated, he thought the differential diagnosis of these cases must be always a difficult matter, and he would like to hear from Dr Hart more particularly how he had arrived at his diagnosis. Dr Foulis has always had an objection to excessive classification, and he would have preferred to see these uterine gestations grouped into the two simple divisions of *extra-peritoneal* and *intra-peritoneal*, the situation of the placenta, as Dr Underhill had pointed out, being the critical test as to their origin. The extra-peritoneal gestations must all originate in the Fallopian tube, and the young ovum growing in that tube distends it until it bursts in the line of least resistance, viz., downwards between the so-called layers of the broad ligament. Any one who has frequently examined extra-ovarian cysts, or cysts of the broad ligament, must have noticed how easily they split up the layers of the broad ligament, and at last swell up against the Fallopian tube, which they stretch over their surface to the extent of a foot or more; and in the same way an ovum in the Fallopian tube could easily distend the tube and grow downwards between the layers of the broad ligament, and become an extra-peritoneal gestation. He could not see why an ovum should not be fertilized in the ovary itself; as yet no such case had been instanced. The fertilized ovum was a parasite, and if it tumbled into the peritoneal cavity and fell on a vascular surface, it would grow there just as well as on the vascular uterine mucous membrane.

Dr James Ritchie said that cilia in all parts of the body have not an inward driving function, because in the bronchial tubes they drive outwards. He suggested, in regard to Dr Barbour's difficulty in finding the membranes, that they may have been absorbed by the peritoneum.

The President said it was fortunate that the discussion had been confined to the pathology of the condition, and also that the subject had been commenced by Dr Hart, who proved, for the first time, that gestation does develop between the layers of the broad ligament. Dr Barbour's case appears to be extra-peritoneal, because the placenta was found outside the peritoneum. It is possible that the child may have developed at first extra-peritoneally, and that the sac ultimately ruptured and allowed the child to escape into the peritoneum.

Dr Berry Hart, in reply to Dr Foulis, said that he diagnosed the condition from the fact that the patient had passed a period, that the uterus was driven to one side, and that there was bulging in the posterior fornix and a tumour to the right of the uterus.

VI. FIFTY CONSECUTIVE CASES OF OVARIOTOMY AND REMOVAL OF UTERINE APPENDAGES.

By J. Halliday Croom, M.D., F.R.C.P.E., F.R.S.E., Physician to, and Clinical Lecturer on Diseases of Women, Royal Infirmary; Physician to the Royal Maternity Hospital; Examiner in Midwifery, University; and Lecturer on Midwifery and Diseases of Women, School of Medicine, Edinburgh.

No. of Case.	Name.	Place of Operation.	By whom recommended.	Age.	Married or Single.	Nature of Case.	Date of Operation.	Result.
I.[1]	Mrs P.	St Luke's Home	Dr James Simpson, Bonnington	46	M.	Multilocular Ovarian tumour	15th February 1884	Recovery.
II.	Mrs T.	Do.	Dr George Mackay, Edinburgh	50	M.	Do.	18th July 1884	Do.
III.	E. S.	——	Dr Halliday Croom	28	S.	Simple Ovarian tumour	20th October 1884	Do.
IV.	Miss H.	Mansfield Place	Do.	39	S.	Do.	2nd October 1885	Do.
V.	Miss A.	9 Queensferry Street	Dr Hedley, Felton, Northum.	31	S.	Multilocular Ovarian tumour	9th December 1885	Do.
VI.	Miss M.	Do.	Dr Halliday Croom	35	S.	Simple Ovarian tumour	6th March 1886	Do.
VII.	Mrs F.	Royal Infirmary	Dr Proudfoot, Kirkcaldy	35	M.	Multilocular Ovarian tumour	31st March 1886	Do.
VIII.	I. B.	Do.	Hospital Waiting-Room	26	S.	Removal of Appendages (Salpingo-Oöphoritis)	19th May 1886	Do.
IX.	Mrs T.	Do.	Dr Duddingston Wilson, Edin.	31	M.	Removal of Appendages (Gonorrhœal inflammation)	2nd June 1886	Do.
X.	Miss A.	9 Queensferry Street	Dr M'Cormick, Glenluce	37	S.	Removal of Appendages (Bleeding Fibroid)	20th June 1886	Do.
XI.	Mrs M.	Royal Infirmary	Dr Barbour, Edinburgh	24	M.	Hæmato-salpinx	20th July 1886	Do.
XII.	Mrs C.	Do.	Hospital Waiting-Room	22	M.	Do.	29th July 1886	Do.
XIII.	E. R.	Do.	Do.	25	S.	Removal of Appendages for Bleeding Uterus	Do.	Do.
XIV.	Mrs E.	Do.	Dr Kirk, Bathgate	34	M.	Removal of Appendages for Bleeding Fibroid	14th September 1886	Do.
XV.	Mrs P.	Do.	Dr Ellis, Durham	42	M.	Multilocular Ovarian tumour	8th October 1886	Do.
XVI.	C. G.	Do.	Dr J. Jamieson, Edinburgh	31	S.	Semi-solid Ovarian tumour	25th October 1886	Do.
XVII.	Miss E.	9 Queensferry Street	Dr Thom, jun., Crieff	30	S.	Parovarian tumour	30th October 1886	Do.
XVIII.	G. A.	Royal Infirmary	Dr MacDonald, Auchtermuchty	19	S.	Semi-solid Ovarian tumour	10th November 1886	Do.
XIX.	Mrs C.	Veitch's Hotel, George Street	Dr Cheetham, Guisely, Leeds	29	M.	Removal of Appendages. Both Ovaries enlarged and cystic	13th January 1887	Do.
XX.	Mrs C.	Murrayfield	Dr Reid, Glasgow	—	M.	Double Ovarian tumour	26th January 1887	Do.
XXI.	O. G.	Royal Infirmary	Mr Fleming, Spylaw Road	29	S.	Removal of Appendages (Bleeding Fibroid)	29th January 1887	Do.
XXII.	M. J.	Do.	Hospital Waiting-Room	31	S.	Removal of Appendages (Salpingo-Oöphoritis)	Do.	Do.
XXIII.	D. W.	St Luke's Home	Dr Haig Ferguson, Edinburgh	23	S.	Removal of Appendages (soft Bleeding Uterus)	11th February 1887.	Do.

XXIV.	A. W.	Royal Infirmary	Hospital Waiting-Room	33	M.	Left Ovarian tumour. Right Ovary cirrhotic	12th February 1887	Recovery.
XXV.	M. M.	Do.	Dr Stiell, Lochgelly	22	M.	Removal of Appendages (Gonorrhœal inflammation)	Do.	Do.
XXVI.	Mrs K.	9 Queensferry Street	Dr Duddingston Wilson, Edin.	24	M.	Removal of Appendages (small cystic Ovaries, thickened Tubes)	10th March 1887	Do.
XXVII.	M. K.	Do.	Dr Henry Laing, Bridge of Earn	20	S.	Parovarian tumour	18th March 1887	Do.
XXVIII.	C. B.	Royal Infirmary	Dr Donald, Leith	28	M.	Left Ovarian blood cyst	19th March 1887	Do.
XXIX.	Mrs F.	9 Queensferry Street	Dr M'Lean Wilson, Penrith	47	M.	Left Dermoid cyst	23rd March 1887	Do.
XXX.	A. W.	Royal Infirmary	Dr Burn Murdoch, Edinburgh	36	M.	Removal of Appendages (Bleeding Fibroid)	4th April 1887	Do.
XXXI.	M. A. D.	Do.	Dr Munro, Arbroath	39	M.	Left Ovarian tumour. Right Ovary cystic	2nd May 1887	Do.
XXXII.	S. M.	Do	Dr Thom, jun., Crieff	35	M.	Multilocular Ovarian tumour	Do.	Do.
XXXIII.	H. F. Y.	St Luke's Home	Dr Barnes, Carlisle	21	S.	Removal of Appendages (Intractable dysmenorrhœa)	18th May 1887	Do.
XXXIV.	P. S.	Royal Infirmary	Dr Haultain, Edinburgh	24	S.	Removal of Appendages (Intractable dysmenorrhœa)	1st June 1887	Do.
XXXV.	M. P.	Do.	Dr Douglas, Cupar-Fife	30	M.	Removal of Appendages (Salpingo-Oöphoritis)	Do.	Do.
XXXVI.	E. M.	St Luke's Home	Dr Sym, Edinburgh	34	S.	Left Simple Ovarian tumour. Right Dermoid cyst	4th June 1887	Do.
XXXVII.	M. I.	Royal Infirmary	Dr J. W. Miller, Dundee	46	M.	Right Semi-solid Ovarian tumour	11th June 1887	Do.
XXXVIII.	A. M.	Do.	Dr James Miller, Dundee	26	M.	Removal of Appendages (Salpingo-Oöphoritis)	26th June 1887	Do.
XXXIX.	A. B.	Do.	Dr Stiell, Lochgelly	32	S.	Double Ovarian tumour	Do.	Do.
XL.	E. O.	Do.	Hospital Waiting-Room	24	M.	Right Dermoid. Left cystic Ovary	11th July 1887	Do.
XLI.	M. B.	Do.	Dr Nivison, Castle-Douglas	40	M.	Removal of Appendages (Cirrhotic Ovaries)	Do.	Do.
XLII.	J. J.	Do.	Dr Rumboll, Grangemouth	27	M.	Removal of Appendages (Gonorrhœal)	22nd July 1887	Do.
XLIII.	K. K.	Do.	Dr Reid, Kirkcudbright	26	M.	Parovarian cyst	Do.	Do.
XLIV.	M. M.	St Luke's Home	Dr Haig Ferguson, Edinburgh	24	M.	Double Ovarian tumour	27th July 1887	Do.
XLV.	F. A. L.	13 Rothesay Place	Dr Vassie, Kirkcaldy	31	S.	Multilocular Ovarian tumour (extensive adhesions)	8th September 1887	Death from shock.
XLVI.	A. W.	Do.	Dr Lyall, Leven	26	M.	Removal of Appendages (Salpingo-Oöphoritis)	18th September 1887	Recovery.
XLVII.	M. J.	Royal Infirmary	Dr Blair, Shotts	19	S.	Removal of Appendages (Salpingo-Oöphoritis)	29th September 1887	Do.
XLVIII.	M. B.	Do.	Hospital Waiting-Room	38	M.	Hæmato-salpinx	Do.	Do.
XLIX.	S. H.	Do.	Dr Ashford, Southwaite	20	S.	Ovaries size of Tangerine oranges	13th October 1887	Do.
L.	I. C.	Do.	Dr Simpson, Bonnington	36	S.	Left simple Ovarian tumour	28th October 1887	Do.

[1] Nos. I. to XVIII. inclusive already referred to in detail in a previous paper.

The cases, of which the accompanying Table gives a *précis*, may be for convenience classified as follows:—

I. Tumours—
Parovarian and Ovarian, 25.

II. Uterine Appendages—
a. For constant pelvic pain and consequent inability for work, 13.
Puerperal or Gonorrhœal.
b. Hæmato-salpinx, 3.
c. Dysmenorrhœa (simple), 2.
d. For fibroid tumour, 4.
e. For bleeding uterus, 2.
f. Blood tumour of ovary, 1.

I need not refer to the ovarian or parovarian tumours. They presented the ordinary difficulties, and were managed in the ordinary way.

The first eighteen cases of this series of fifty have already been referred to more or less in detail in a previous paper.

The only case which demands attention in this group is XLV., where the issue was fatal. It was a large multilocular ovarian tumour, with very extensive pelvic adhesions. The patient was a delicate young lady, and it was with difficulty we could keep up the heart's action till the completion of the operation, which lasted for an hour and a half. She died two hours after from shock.

It will be seen by a reference to this list that the ovaries have been six times removed for uterine hæmorrhage, four times where the hæmorrhage has been due to fibroid tumour, and twice where there was no fibroid, but where the uterus was soft and flabby and ovaries enlarged. With regard to the fibroid cases, I must say that my experience has been so far satisfactory—that is, though the patients still continue to have more or less hæmorrhage, it is not so extensive as formerly nor so long continued. In one it has entirely ceased.

It is true that no very long time has elapsed since I did the first—only a year and a half—yet in bringing forward a record it is well to give results up to date. Further, the operation in the case of large fibroids—take, for example, Case XXX., the size of a six months' pregnancy—is by no means easy. There, owing to the shortening and splitting of the broad ligament, it was impossible to use the Staffordshire knot, and therefore with great difficulty the tumour was rotated until the ovaries were successively brought into the abdominal wound and removed by means of the clamp and cautery. Though the patient recovered, yet it was not

without a very extensive burn on the abdominal wall. Since I became acquainted with Apostoli's electric treatment of fibroids, I have not removed the ovaries for this cause. My experience of Apostoli warrants me in offering my opinion that the theory, so far as fibroids are concerned, seems feasible, and I may add that the results I have obtained have been so far extremely gratifying.

In the two cases where the uterus was soft and flabby, and no fibroid to be found, the result has been at once and entirely satisfactory. Both the girls, who had been previously completely laid aside from work, have resumed their ordinary duties, and have had no return of the hæmorrhage. They were both exsanguine to a degree, and are now well coloured and able for full duty—the one as a Board school teacher, and the other as a domestic servant. I question if Apostoli's treatment in such cases would be of any avail; certainly the cure could not be more complete.

I showed the ovaries to the Society. In both cases they were large and cystic throughout. No amount of local electric treatment would have affected them. They were the cause of the hæmorrhage. They were not likely to be of any functional use. They were, as the result has shown, better away.

Three times hæmato-salpinx was met with. The preparations have already been shown to the Society, and two of them described in detail. In the first two cases, on which I operated about a year and a half ago, the women still continue to have irregular hæmorrhages, though they are able for their ordinary duties. The third one has only been recently operated on.

In two cases the ovaries were removed for dysmenorrhœa pure and simple. These were Cases XXXIII. and XXXIV. Both patients were completely laid aside during their menstrual periods, both had to gain their livelihood by their own exertions, and in both cases all the ordinary means of treatment had been exhausted. There was nothing left but the removal of the ovaries, in the hope of inducing an early menopause; and in both cases, though menstruation has returned at irregular intervals, the cure of the dysmenorrhœa has been complete.

I now come to speak of the removal of the appendages for constant pelvic pain, and where the ovaries and tubes were the seat of inflammation either of puerperal or gonorrhœal origin. Thirteen such cases have been operated on, and in each of those cases the operation was performed only as a *dernier ressort*. Most, if not all, of them had undergone long and varied treatment before they fell into my hands, and in all of them the ordinary treatment for the cure of pelvic inflammation was adopted before the operation was performed.

In all of them the immediate result of the operation was satisfactory, and although it is impossible to draw definite results from recent cases, yet, so far as I have been able to trace them, the

results have been most encouraging. What, for instance, can be more satisfactory than Case XIX.; or what, I ask, could have else been done for her? She had a retroverted uterus, with two large ovaries and distended tubes, and had been practically bedridden for nearly two years, during which she had undergone treatment of all kinds. Here is an extract from a letter I had from her two days ago:—"I feel I should like to let you know how well and strong I now am. I am now staying with my mother and sisters in Wales, and am now able to walk two or three miles with ease and comfort, and I am better and stronger than I have ever been since I married."

It seems to me extraordinary that men should quibble and carp at these operations when they can suggest no better means of relieving the patients' sufferings. That the operations are done when they might be avoided may for anything I know be perfectly true. There are plenty of arms and legs sacrificed every year by careless surgeons that in the hands of a skilful conservative surgeon might be preserved. And I have no doubt that in gynæcological surgery ovaries and tubes are taken away that might have been allowed to remain. But that does not affect the general question. In a case of diseased tubes and ovaries—and this is a description of all the cases in which I have interfered—where the woman suffers constant pelvic pain, dysmenorrhœa, dyspareunia, menorrhagia, and is unable to pursue her ordinary avocations, and after the ordinary means have been persistently used, I wish to know what is to be done? The removal of the organs in most cases has been shown to give entire relief; the organs themselves are functionally useless, and therefore the operation in properly selected cases is not only safe and justifiable, but one strongly to be recommended.

Unquestionably the most unpleasant after-result that has occurred in my experience is the development of an abdominal hernia. This has occurred three times. In none of the three cases is it very bad, and curiously enough it occurred in those cases where the abdominal wound has been smallest—not measuring more than an inch and a half.

In two cases the operation was unilateral, not by option, but of necessity, as, in Case XXV., I was unable to separate the ovary and tube owing to extensive adhesions on right side; and, in Case IX., I removed the right ovary and tube, and on the left the distended tube, but was unable to remove the ovary.

Dr Berry Hart said that Dr Croom was to be congratulated on his percentage. The present generation was reaping the benefit of the labours of Keith, Spencer Wells, etc. With regard to the question of the removal of appendages, Dr Hart agrees with Dr Croom that when the appendages are diseased they should be removed. In one case, lately under Dr Hart's care, the patient

had suffered for five years from pain, dysmenorrhœa, and hæmorrhage. He removed the uterine appendages with the best result, and the woman has now begun to enjoy life.

Dr Keiller said that such was the safety of well-performed ovariotomy, that it was almost impossible now-a-days to kill a woman by the operation. Dr Keiller was old enough to remember when it was thought extremely dangerous to touch the peritoneum, and when patients were allowed to die because of the surgical dread of it. The wonder is that so many cases turn up now to be successfully operated on. He congratulated Dr Croom on his evident success.

Mr Skene Keith referred to a paper by Sir James Simpson written forty years ago, and entitled, "Is Ovariotomy Justifiable?" Mortality then was 4 in 10, and the operation was considered by Sir James to be justifiable. Patients who have had uterine appendages removed should be watched for years before the verdict of success or non-success can be pronounced. Dr Keith operated on a case that took eighteen months to recover, and who relapsed several years afterwards. One patient that Mr Skene Keith operated on two years ago, and who was quite well one year after, is now ill again, although there has been no return of menstruation. He thinks you are more likely to have a hernia occurring in a small wound, because all the pressure is exerted on a small area. We don't know enough about electricity yet; it certainly can stop hæmorrhage, at least for a time.

Dr Halliday Croom thanked the Fellows for the reception they had given his paper. He did not know enough about the after-history of his cases to be able to give definite results.

MEETING III.—DECEMBER 14, 1887.

DR UNDERHILL, *President, in the Chair.*

I. Communication from the College of Physicians, Philadelphia, relating to the "Jenks Prize":—"$250 *Prize; Competition Open to all the World.*—The first award under the William F. Jenks Prize Fund, of the College of Physicians of Philadelphia, will be made by the Committee, for the best essay upon 'The Diagnosis and Treatment of Extrauterine Pregnancy,' as soon after January 1st, 1889, as may be practicable. Papers for competition must be written in English, and be presented by the said date. The prize essay is to become the property of the College.—By order of 'The Committee of the William F. Jenks Prize,' ELLWOOD WILSON, Chairman, 1517 Walnut Street, Philadelphia, Pa., U.S.A."

II. NOTE OF A CASE OF LABOUR IN A KYPHOTIC PELVIS.

By N. T. Brewis, M.B., F.R.C.P. Ed.

The changes wrought on the pelvis by kyphosis and scoliosis have been treated in a masterly way, and our knowledge of the subject has been greatly advanced by one of our Fellows, Dr Barbour, in his work on *Spinal Deformities in relation to Obstetrics;* but, as far as I am aware, no case of labour in a kyphotic pelvis has been reported to the Society, and as I had the fortune to have charge of a case two years ago, I think it my duty to narrate it here.

In June 1885, Dr Sidey very kindly asked me to attend at her confinement, R. H., an unmarried woman of 33 years of age. The patient was a primipara, and when I first saw her was about eight months pregnant. She is affected with well-marked kypho-scoliosis of the dorso-lumbar region, which patient says originated from a fall which she had when nine years of age. She was well nourished and in the enjoyment of good health, and had experienced no discomfort during her pregnancy, with the exception of painful dragging sensations at the lower part of the sides of her chest, caused by the weight of the pendulous uterus dragging on the attachments of the abdominal muscles.

Physical Examination.—Patient's height is 4 feet 4 inches. Owing to the lateral bend of the vertebral column, the right anterior superior iliac spine measures from the ground a distance of 33 inches, while the left measures 34 inches. A similar difference exists in the height of the shoulders, the left measuring 43½ inches from the ground, the right 42 inches. In the erect position, the tips of the fingers of the right hand reach the middle of the knee, while the left reach a point about 2 inches above the knee. The spinal deformity exists in the dorso-lumbar region, and involves the vertebræ between the fourth dorsal and second lumbar. The upper limb of the bend measures, along the spinous processes, 5½ inches, and is directed backwards and towards the left. The apex of the curvature is formed by the ninth dorsal vertebra. The distance from the base to the projection of the body forming the apex is 5¾ inches. The length of the lower limb of the projection is 5 inches. The direction of the whole projection is first directly backwards, then backwards and outwards towards the left, the most outward and projecting point being the left edge of the body of the ninth dorsal vertebra. The lower limb passes at first downwards and inwards for a distance of 2 inches, then sharply forwards and to the right for a distance of 3 inches, till it joins the middle line in the region of the second lumbar vertebra.

On the right side the crest of the pelvis overlaps part of the chest from the seventh rib downwards. On the left side there is no overlapping.

The sternum from the second costal articulation slants downwards, forwards, and to the left.

Examination of Abdomen.—Patient lying on her back. The abdomen is very pendulous; its lower edge overhangs the symphysis pubis for a distance of 2 inches. The tumour reaches to within ½ an inch of the ensiform cartilage, and has a left lateral obliquity. Two-thirds of the tumour lie to the left of the middle line. The linea nigra is well marked. At a distance of 1½ inch above the umbilicus a dark line, pigmented like the linea nigra, is seen running round the anterior part of the body, and is continued round the back, though there it lies deeply pigmented. The umbilicus is also deeply pigmented. The fœtal heart is distinctly heard in the left inguinal region, beating 168 per minute. The uterine bruit is loudly heard at a corresponding point on the right side. The right iliac crest is on a higher level than the left. Both iliac crests project prominently outwards. When the patient assumes the erect posture the abdomen becomes very pendulous, its lower limit reaches fully 6 inches below the mons veneris. Also, when standing, the ilio-femoral ligaments are rendered very tense and are easily felt.

Pelvic Measurements.—Interspinous, 8¾ inches; intercristal, 10¾ inches. Distance between right anterior superior iliac spine and right posterior iliac spine is 6¼ inches. From right iliac crest to right ischial tuberosity, 7¾ inches. From left anterior superior iliac spine to left posterior iliac spine, 6 inches. From left iliac crest to left ischial tuberosity, 7½ inches. Between posterior iliac spines, 3½ inches.

Vaginal Examination.—In the middle third of the vagina, stretching across it, is a thin diaphragmatic septum with an aperture in the centre admitting one finger. The promontory of the sacrum cannot be reached. The ischial spines are very easily felt, and project markedly inwards, especially the left; from their level downwards there is a gradual increase of the narrowing. The distance between the internal surfaces of the ischial tuberosities is 2¼ inches. (I had Dr Angus Macdonald's kind help in making the last-mentioned measurement, which was done according to Chantreuil's method, which method is described in Dr Barbour's work.) The pubic bones are approximated towards each other, the pubic arch is narrowed, and the descending rami run backwards, nearly parallel to each other, to the ischial tuberosities. The sacrum at its lower part is bent forwards; its upper bones cannot be felt. The coccyx is very movable. The distance between the sacro-coccygeal joint and the lower edge of the symphysis pubis is 3½ inches. From the apex of the sacrum to the ischial tuberosities is 2½ inches.

The pubic articulation is widened anteriorly, the outer edges of the extremities of the bones being felt to be sharp and separated from the cartilage of the joint.

There is very marked pelvic floor projection.

Labour began about 4 o'clock in the afternoon of July the 25th. I saw her at ten in the evening, and on making an examination found the cervix undone, the external os dilated to the size of a shilling, the membranes unruptured, the head presenting, lying loosely with its long axis in the conjugate diameter of the brim, the occiput to the front; both fontanelles could be felt. The shoulders are lying immediately over the symphysis pubis; the back of the child can be felt through the anterior surface of the pendulous abdomen. The head, therefore, in the first stage, is extended with its sagittal suture in the conjugate of the brim.

I saw her again at four o'clock in the morning; the cervix then was fully dilated, and retracted over the head, which had reached the level of the ischial spines; the membranes were still intact and bulging down before the head, occupying the whole of the pelvic outlet, and reaching to the vulva. The patient was at once anæsthetized and placed in the lithotomy position. I then burst the membranes and made a careful examination of the head, the long axis of which was now lying in the right oblique diameter of the pelvis, the occiput to the front and pressed against the pubic bone; the anterior fontanelle was very easily felt, the sinciput being on a lower level than the occiput. So that at the lower part of the pelvis the head was lying extended, its sagittal suture in the right oblique diameter, with the occiput to the front.

I at once applied axis-traction forceps, fixing the blades well forward on the hinder part of the head, and by very strong traction brought it down and fixed it in the outlet. This manœuvre changed the obliquity of the head from that of extension to flexion, and at the same time brought it from the right oblique diameter of the pelvis to the conjugate. Having now got the head well flexed and grasped by the outlet in its smallest diameter, the sub-occipito-bregmatic, I took off the forceps and reapplied them, the grip in this instance being a good lateral one. Knowing that there was more room in the posterior part of the outlet, behind the tuber ischii, traction was made downwards and backwards, and after two or three powerful pulls the occiput was first brought through, and then by altering the line of traction to upwards and forwards the face was born over, or, more correctly speaking, through the perineum; the shoulders and body quickly followed.

There was now a very free escape of blood from the vagina, so the placenta was quickly expelled by the Credé method, and 3 grains of ergotin injected into each hip. The uterus contracted well, but still the hæmorrhage continued, so I introduced my whole hand into the vagina to find out its cause, when I discovered

that it was proceeding from deep lacerations of the vaginal wall immediately over the ischial spines, especially the left, and along the inner surfaces of the ischial tuberosities. This hæmorrhage was ultimately checked by a stream of hot water.

During the extraction of the head the perineum gave way; the tear extended up to but not through the sphincter ani, and then deviated to the right side of the anus. A finger was passed into the rectum to find out if the vaginal wound was prolonged into it, but no opening could be discovered.

The perineal tear was not stitched, for the reason that owing to the contraction of the hard parts at the outlet the pelvic floor was pendulous, hanging down like a pouch, so that the cut surfaces remained in apposition. A week afterwards the tear was found to be firmly united throughout its whole extent.

The patient made an excellent recovery. The child was born alive, of male sex, and its head had the following measurements :— *Diameters*—Occipito-mental, 5½ inches; occipito-frontal, 4½ inches; sub-occipito-bregmatic, 3¼ inches; biparietal, 3½ inches; bitemporal, 3 inches; fronto-mental, 3¼ inches; cervico-bregmatic, 3 inches.

Circumferences.—Occipito-mental, 15 inches; occipito-frontal, 14 inches; sub-occipito-bregmatic, 12¼ inches.

Remarks.—Although our patient has very distinct kypho-scoliosis of the vertebral column, I have called the pelvis kyphotic, for the reason that when rickets is absent, as in this case, and when the kypho-scoliotic bend is in the dorsal region of the spine, the scoliosis does not to any extent affect the shape of the pelvis; the kyphosis is the active factor and the pelvis is essentially kyphotic.

With regard to the position of the head at the brim, it is interesting to note that it was found lying with its long axis in the conjugate diameter. This coincides with the experience of a number of observers, but is contrary to that of Champneys, who found in a series of cases investigated by him that the head at the brim lay always more or less transverse.

The extension of the head at the brim probably resulted from the extreme anterior obliquity of the uterus. The uterus by contracting and attempting to straighten itself may have caused the occiput to be caught and detained at the edge of the pelvic brim, and at the same time caused descent of the forehead.

At the level of the ischial spines the head was found with its sagittal suture in the right oblique, so that rotation backwards from the conjugate to the oblique had taken place. Rotation backwards is mentioned by Barbour to be favoured by the shape of the pelvis, and Champneys says that the head usually emerges through the outlet in the transverse or oblique, so that at the lower part of the pelvis an oblique or transverse position seems to be most com-

monly met with. The low position of the anterior fontanelle is of interest as showing that no flexion had taken place in the passage of the head through the pelvic cavity.

The impediment to labour in the kyphotic pelvis is at the outlet, and in considering the question of operative interference the bony boundaries of the outlet have to be kept in view. In our case the head emerged entirely behind the ischial tuberosities, through the space bounded by the ischial tuberosities in front, the apex of the sacrum behind, and the ischial spines at the sides. The distance between the ischial tuberosities was $2\frac{1}{4}$ inches, between each ischial tuberosity and the apex of the sacrum $2\frac{1}{2}$ inches, and between the ischial spines, which distance was not measured, but may be called $3\frac{1}{2}$ inches. When the head is passing through the outlet its passage is favoured by important conditions of the pelvis, viz., nutation of the sacrum, and a yielding outwards of the ischial tuberosities. In the kyphotic pelvis a rotation takes place, round the second sacral vertebra, of the base of the sacrum backwards, and the apex of the bone forwards; at the same time the sacro-sciatic ligaments are slackened. The sacro-iliac joint admits of considerable movement, especially when the weight of the trunk is taken off the sacro-iliac ligaments, as is the case when the patient is lying down; consequently, force applied to the apex of the sacrum will cause the lower end of the bone to yield backwards, and thereby increase the conjugate of the outlet. The ischial tuberosities have been noticed to yield to a considerable extent when pressed apart, so that we should remember this possibility in estimating the transverse of the outlet.

Dr Barbour, in discussing operative interference, says, that if the child's head is lying in the conjugate of the outlet, a transverse of $3\frac{1}{4}$ inches would be a limit for forceps, because we have a biparietal diameter of $3\frac{1}{2}$ inches engaging in the transverse.

This is certainly true, but he errs in considering the transverse of the outlet to be the distance between the ischial tuberosities. In labour the head emerges, or can be made to emerge with the aid of forceps behind the tuberosities, so the transverse to be taken into account is that between the ischial spines, which is greater than between the tuberosities.

Unfortunately, no attempt was made in our case to estimate the distance between the spines, but I feel certain that it would be from an inch to an inch and a half greater than that between the tuberosities; and if we disregard the soft parts and take into consideration the backward yielding of the lower end of the sacrum and the possible yielding outwards of the tuberosities, we can understand that the conditions in our case were such as to allow an ordinary sized head to be drawn through.

That the greatest resistance in the transverse diameter in our case took place at the ischial spines was proved by the lacerations found there.

The child's biparietal diameter was 3½ inches; the sub-occipito-bregmatic diameter of the child's head was 3¼ inches, showing that lengthening of the conjugate to the extent of ¾ths of an inch occurred. I point out these factors to show that operative interference may be more successful than the appearance of the deformity indicates, and one has less fear of seriously injuring the patient when one remembers that the deformity is at the outlet, and that the peritoneum is well out of the way.

Professor Simpson said that he had not met with a case of this rare deformity. He was specially interested in the record of Dr Brewis's case, but had difficulty in understanding how the head could be got through a pelvis of such narrow dimensions.

The President remarked that it was not necessary to have deformity of the pelvis in all cases of deformity of the spine.

Dr Brewis, in reply to Professor Simpson, said that if we regard the distance between the ischial tuberosities to be the transverse of the outlet, then delivery of a living child, in the case recorded, through that diameter would have been impossible; but as the head was brought through in the space behind the ischial tuberosities, the real transverse diameter was the distance between the ischial spines, which was estimated at 3½ inches. This measurement, along with backward yielding of the apex of the sacrum and outward yielding of the ischial tuberosities, gave sufficient room for delivery to be effected. With regard to Dr Underhill's remarks, Dr Brewis said that deformity of the pelvis depended very much on the age of the patient at the time of the development of the spinal deformity, and also whether or not rickets was present. In the latter case the pelvis may have only rachitic characteristics.

III. TUBAL DISTENSION AND STRICTURE: A CAUSE OF INTRA-PERITONEAL HÆMORRHAGE.

By E. Sinclair Stevenson, F.R.C.S.E., Fellow Obstetrical Society, London; Fellow British Gynæcological Society.

On opening the pelvic cavity and looking at the appendages when in a state of physiological repose, that is when ovulation is in abeyance, the Fallopian tubes are seen lying loosely with their fimbriated ends unattached to the ovaries. On the other hand, during the congestive state which attends ovulation, the tubes, through the contraction of their transverse muscular fibres, lengthen, so that their extremities are enabled to grasp the escaping ovum from any part of the ovary. The loose folds of the mucous lining of the duct being straightened and smoothed by this process of extension facilitates the progress of the ovum, and brings into play a larger surface of epithelium, which propels it onwards to its destination.

Whatever disease which leads to a permanent obstruction or dilatation of the tubes, may give rise to hæmorrhage in the pelvic cavity. I assume that with every rupture of a Graafian vesicle an escape of blood takes place, generally a few drops only; but in cases where we have a highly congested state of the ovaries, considerable loss of blood may follow.

I have in several cases of laparotomy found recent traces of a freshly escaped ovum; the ruptured vesicle had a small quantity of blood in it which could be wiped off; and in a case of oöphorectomy for severe menorrhagia, I have seen blood escaping freely from a ruptured vesicle.

When a stricture exists completely occluding the canal, the escaping ovum, if any, must necessarily drop into the peritoneal cavity. This I simply assume as being a natural consequence; I have not seen it. Moreover, I am not certain that in such diseases where the patency of the tube is destroyed the process of ovulation is not interrupted; but where there is dilation, with shortening, the fimbriated extremities are unable to reach and grasp the escaping ovum, and when there exists an engorged condition of the ovary, serious intra-peritoneal hemorrhage may occur.

Mrs R., æt. 31, iv.-para. Her illness dated from her second pregnancy. From that time there had been a deplorable history of constant pain, much exaggerated during her menstrual periods, which were excessive, and followed by a yellow discharge. Besides these, there were frequent vomiting, dysenteric symptoms, dyspareunia, and dyscinesia. The last two pregnancies had been extremely painful, the last child dying soon after birth. No history of gonorrhœal infection could be got from her husband. In the left pelvic region an indistinct painful swelling could be felt, and per vaginam a tortuous mass could be detected in the left fornix. Hæmato- or pyo-salpynx was diagnosed. Interference was delayed to enable her to recover from the effects of her last confinement, which had been tedious. After two weeks of rest and careful feeding, the date of the operation was fixed. However, three days before that time, after some hours of intense suffering, she became faint and cold. Suspecting intra-peritoneal hæmorrhage from the bursting of a tube, I operated with as little delay as possible.

On the 3rd of February 1887, three months after confinement,—Drs Murray and Evans present—by means of an incision 1½ inch, the left Fallopian tube was seen to be enlarged to more than three times its size, and the broad ligament thick and hyperæmic. The ovary and tube were then removed, the oviduct containing much blood. On inspecting the right ovary, I found on its posterior surface a recently ruptured Graafian vesicle from which blood was escaping freely in the pelvic cavity; the corresponding duct and ovary were engorged, but the tube was patent. The right

ovary and tube were also removed, and the peritoneal cavity washed out, and clots and blood removed. The patient made an uninterrupted recovery.

This case illustrates clearly the views expounded in this paper. That there was intra-peritoneal hæmorrhage, and that from a ruptured vesicle, was proved beyond doubt.

I have had under observation several cases of tube disease, and I believe that the so-called recurrent attacks of local peritonitis, which are frequently associated with this condition, are often the result of intra-peritoneal hæmorrhage.

I do not suppose that this case will make the exception to King Solomon's dictum—"That there is nothing new under the sun," for some months after the operation I read of a case of hæmorrhage from a ruptured vesicle. I regret much that I could not find the paper again, but there was nothing said of the condition of the tubes.

Mr Skene Keith said that, in order to see an ovary lying in position, an incision of several inches is needed, and as the incision in Dr Stevenson's case was said to be only 1½ inches, the ovary must have been drawn up to the surface, and possibly may have been injured.

Dr Foulis said that the blood which escapes from the Graafian follicle is small in amount; he doubts if more than one or two drops escape, except in women affected with hæmophilia. Even if a few drops did escape into the peritoneal cavity, no harm would follow, provided that the blood is aseptic. Oozing blood coagulates whenever it touches the ruptured surface. Blood in a placenta does not coagulate until the vessels are torn across.

Professor Simpson said it was unfortunate that the author was not present to explain some of the points which in his absence were difficult to discuss. Professor Simpson believes that hæmorrhage may occur from the ovary to a pathological degree.

The President said that a considerable quantity of blood was removed from the peritoneal cavity, and the question was, whether it came from the ovary or tube? In the author's absence it was unnecessary to criticise.

IV. SOME SCARLATINIFORM RASHES OCCURRING DURING THE PUERPERIUM.

By G. Owen C. Mackness, B.A. (Oxon), M.B. C.M., Late Resident Physician Royal Maternity Hospital.

It is not my intention to discuss generally the subject of scarlatiniform rashes during the puerperium, but merely to communicate a series of five cases which occurred at our Maternity Hospital during the quarter ending October 31st, 1887, and to try

to suggest some possible explanation of their occurrence. These cases all showed certain similar symptoms, and conformed to a definite type. As far as I have been able to discover, no similar cases have hitherto been recorded; for although Guéniot notes and describes certain puerperal scarlatiniform rashes, yet his cases differ from these in certain material points, as I shall presently show.

The following are the clinical records of the cases:—

Case I.—Isabella A., æt. 19, i.-para; confined on August 14th, 1887, of a healthy male child; low forceps applied.

			Temperature.		Pulse.		
	Aug. 14	1	99·2	99·6	75	77	
	,, 15	2	98·4	99·8	76	79	Lochia moderate.
	,, 16	3	98·6	101	84	120	
Rash.	,, 17	4	98·8	100·2	87	96	Rash appeared on face.
	,, 18	5	98·6	100·4	89	98	Rash all over body.
	,, 19	6	99·2	99·8	96	98	Rash more marked. Lochia scanty.
	,, 20	7	99 4		89		

17*th August.*—Rash appeared on face, eyelids swollen.

18*th.*—Rash all over body. Urine contained no albumen. No headache or sore throat.

20*th.*—On Dr Wood's recommendation she was sent to the Observation Ward of the City Fever Hospital. She was kept there for a week and then dismissed, as no symptoms of scarlet fever developed themselves.

Case II.—Martha L., æt. 21, ii.-para; confined on August 17th, 1887, of a healthy male child. The placenta was partly adherent, and had to be removed with the hand.

			Temperature.		Pulse.		
	Aug. 17	1		101·2		96	
	,, 18	2	97·6	99·8	87	89	Lochia profuse; some clots.
	,, 19	3	98·4	100·6	104	96	Lochia slightly offensive.
	,, 20	4	98·6	100·8	100	106	Lochia very scanty; rash appeared; uterus washed out.
	,, 21	5	99·4	99·8	100	98	
Rash.	,, 22	6	99·8	100·4	94	90	Rash less distinct.
	,, 23	7	99·4	101·6	102	101	Lochia scanty; still slightly offensive.
	,, 24	8	98·8	100	92	86	Suffering from severe headache.
	,, 25	9	98·4	99·2	85	89	Rash almost gone.
	,, 26	10	97·8	98·8	82	79	Lochia stopped.

20*th August.*—Rash appeared over whole body but not over face. No sore throat or headache. Tongue normal.

22*nd.*—Red blush much less distinct; no albumen in urine.

CASE III.—Christina B., æt. 25, ii.-para; confined on August 21st, 1887, of a healthy female child. An old tear in the perineum extended farther back during delivery.

			Temperature.		Pulse.		
	Aug. 21	1		99·6		99	
	,, 22	2	97	98·2	74	80	
	,, 23	3	98·4	99·6	98	97	Lochia moderate.
Rash.	,, 24	4	98·2	99·6	101	106	Lochia slightly offensive; rash appeared.
	,, 25	5	99·2	99·2	100	91	Lochia scanty and offensive; uterus washed out.
	,, 26	6	97·8	100·2	88	94	
	,, 27	7	98·4	99·2	84	78	
	,, 28	8	99	98·4	79	74	Lochia not offensive.
	,, 29	9	99	98·2	77	62	Rash disappeared.
	,, 30	10	99	99	72	63	Lochia stopped.

24*th August.*—Well-marked rash all over body; face red and eyelids swollen. No albumen in urine.

25*th*, 11 A.M.—Rash scarcely over face, more marked on arms; moderately marked over trunk and lower extremities. 8 P.M.—Rash less marked.

26*th*.—Rash very marked over abdomen. A number of small vesicles present for an area of about 1″ round umbilicus, also extending in a line on the right side outwards; no pain or itching; varying from size of pin's head to split-pea.

28*th*.—Rash only present under binder; vesicles rather less in extent.

29*th*.—No rash visible. All the vesicles are flatter, and some are dried up.

CASE IV.—Mrs. C., æt. 22, iii.-para; confined on September 4th of a healthy male child. Labour normal.

			Temperature.		Pulse.		
	Sept. 4	1		99·2		78	
	,, 5	2	97·8	98	70	70	Lochia profuse, with small clots.
	,, 6	3	98·4	98·2	88	74	Lochia moderate.
	,, 7	4	98·2	98·2	82	70	Lochia slightly offensive.
	,, 8	5	98·4	98·6	80	74	
	,, 9	6	98·6	101·6	78	100	
	,, 10	7	102·2	101·6	102	100	Lochia slightly offensive and scanty.
	,, 11	8	99·8	98·8	96	80	
Rash.	,, 12	9	98·2	98·4	74	76	Rash over face and chest.
	,, 13	10	98·2	101·8	74	84	Rash gone.
	,, 14	11	99·2	98·8	89	86	

This case differs from all the others in that although the discharge was slightly offensive on the fourth day, yet no rash

appeared until the 12th day after delivery; the other symptoms pointing to the fact that there was some poison in the body, viz., the rise of temperature and pulse-rate, appeared before this.

CASE V.—Jane S., æt. 16, i.-para; confined on 20th September of a healthy female child; labour normal.

			Temperature.		Pulse.		
	Sept. 20	1		99·4		70	
	,, 21	2	98·6	98·8	76	78	Lochia profuse, with clots.
	,, 22	3	98·8	99	80	80	
Rash.	,, 23	4	98	98	82	98	Lochia slightly offensive; rash appeared.
	,, 24	5	98·6	98·8	88	80	
	,, 25	6	98·4	98·8	84	72	
	,, 26	7	98·4	99·2	84	92	Lochia almost sweet; rash gone.
	,, 27	8	98·4		84		

23*rd September.*—Rash appeared over trunk and legs, especially marked under binder, slightly over chest, none on face or arms; no albumen in urine.

24*th.*—Rash nearly gone, only present under binder and over thighs.

In these cases a rash appeared, attended by no bad results to the patients, and although the lochia in most of them were offensive, attended by a rise in the temperature and pulse-rate, yet these conditions disappeared in a few days, and in most cases without any treatment whatever. These rashes, then, seem to have no clinical significance as far as the patient's immediate well-being is concerned; yet they are of some importance in that they may easily be mistaken for cases of mild scarlatina where the sore throat and other ordinary symptoms are not developed, the only manifestation being the rash. This was actually the case with the first of these patients, who was carefully isolated as soon as the eruption appeared, and then sent to the Observation Ward of the Fever Hospital on the advice of one of the physicians of that institution, who was called in to see her.

As far as I have been able to discover, the only mention made of these rashes in English is by Dr Angus Macdonald[1] in his report of our Maternity Hospital for the quarter ending April 30th, 1885. He writes as follows: "A diffuse *erythematous eruption* occurred during the puerperium in two patients. They suffered no ill effects, and the rash disappeared in a few days. No satisfactory cause could be ascertained." Charpentier[2] writes thus: "Under the influence of the abundant perspirations that women experience it is not uncommon to see *scarlatiniform eruptions* developed, to which Guéniot has called attention, and it is

[1] *Edin. Obstet. Trans.*, vol. x. p. 232.

[2] *Traité pratique des accouchements*, vol. i. p. 552.

necessary to take great care not to confuse these with scarlatina. It is sufficient to powder the patients with "*poudre d'amidon*" to bring about a notable relief in the itching." Here itching seems to be the prominent symptom, a condition which was never present in the above cases, showing that they were probably of a different nature. I have, unfortunately, not been able to obtain access to Guéniot's thesis on this subject, which was published in 1862, but in 1870 the Medical Society of the Paris Hospitals discussed this question, and Dr Besnier then said: "The subject has been carefully investigated by M. Guéniot in his inaugural thesis, a very remarkable work, in which the author discusses with the greatest ability the nature of scarlatina in lying-in women. Preserving the most laudable reserve in his conclusions, M. Guéniot does not give an absolute opinion on what he proposes to call *la scarlatinoïde* of lying-in women. He thinks that it constitutes a special form of disease, but leaves to further observation the burden of deciding if *la scarlatine* and *la scarlatinoïde* are absolutely distinct, or if one is to the other what *la varioloïde* is to *la variole*." From this abstract, which is all that I have been able to obtain, it is impossible to say whether his cases were similar to those recorded above; probably, however, they were not so. Evidently, then, there are various other forms of scarlatiniform eruptions which appear during the puerperium besides those which occurred with us this year. The belladonna rash, of course, comes in a totally different category, being caused by the use of a drug, and is not to be considered with these.

For some reason or other the rash in Case IV. did not appear until the twelfth day, although there was a rise in temperature and pulse-rate before then, while the lochia were also offensive. I have therefore excluded this case as an aberrant one, and taking the average daily temperature and pulse-rate in the other four cases, have constructed a Table which may be looked upon as showing the typical range of temperature and pulse-rate in this condition. For comparison sake, there is placed beside it a Table showing the average temperature curve during the puerperium, taken from Parvin's work on Obstetrics. This latter chart, however, shows a higher range of temperature than is seen in a normal case in our Maternity Hospital, where it has long been observed that the temperatures are usually below the average. This, however, only emphasizes the fact, that when these rashes occur the temperature is slightly above the average throughout, commencing on the third day after delivery, while in some individual cases it went up as high as 100°·8 F. to 101°·6 F. Parvin states that the average normal pulse-rate during the puerperium is between 50 and 60, while it is usually lowest from the fifth to the seventh day. On looking at the Table when these rashes are present, it is seen that the pulse-rate is enormously increased, going up even to 102 on the evening of the fourth day.

	Average Temperature, with Rash.		Average Pulse-rate, with Rash.		Parvin, Normal Temperature.	
2nd day.	97·9	99·2	78	82	98·4	98·8
3rd ,,	98·6	100·1	92	98	98·2	98·8
4th ,,	98·4	99·7	93	102	98·2	98·4
5th ,,	99	99·6	94	92	98·2	98·8
6th ,,	98·8	99·8	91	89	98·4	98·6
7th ,,	98·9	100·4	90	90	98	98·4
8th ,,	98·6	99·6	85	80	98·2	98·4
9th ,,	98·7	98·8	81	76		
10th ,,	98·4	98·5	77	71		

The character of the rash was in all cases the same. It consisted at first of a number of minute red points or papules, which appeared at the hair follicles, and then between these there appeared a red blush. The redness disappeared on pressure. After lasting for some days the red blush began to fade away, leaving only the red points, which eventually disappeared also. It appeared promiscuously over the body, but least often over the face. It was most marked and persisted longest over the abdomen, which was covered by the binder. In Case III. there were in addition a number of small vesicles round the umbilicus, herpetic in appearance, but accompanied by no pain or itching. These gradually dried up and disappeared. The rash was never accompanied by any pain or itching. No sore throat, headache, or foul tongue were present. There was no albumen in the urine in any of the cases.

The patients were getting the ordinary Hospital diet; they were douched twice daily with 1–5000 corrosive sublimate solution; they were taking no drugs, except that on the third day after delivery they had a dose of Henry's solution, which was repeated when necessary. No belladonna was being used by them. In two cases the uterus was washed out, but in the others no treatment was adopted beyond keeping the bowels open. In all the cases, except the fourth, the rash appeared on the fourth day after delivery. Three cases occurred in one week, while all occurred within a period of five weeks.

I would suggest the following as a possible explanation of the condition:—Some blood-clot is retained *in utero*, as is shown by the fact that in three of the cases the lochia are described as "profuse, with clots," while the fourth case is that of a multipara, in whom this condition would be very likely to occur. This blood-clot then undergoes a process of fermentation or decomposition, as evidenced by the offensive smell of the lochia. Some of the products of fermentation are absorbed into the system, and indicate their presence by the rise in temperature and pulse-rate, which are always found. These irritating products, which are circulating in the blood, are then excreted by the sweat-glands of the skin among

other channels, and by their irritating action give rise to this rash. This is shown by the facts, that the rash is only found so long as there is evidence of the presence of these waste products, and that it appears first as punctate spots at these glands, and persists longest where sweat secretion is most active, viz., under the binder, which keeps the skin warm and moist.

The fermentation or decomposition does not seem to have been ordinary septic decomposition, in that the lochia soon became sweet again without any treatment, and no bad effects followed in any of the cases. Moreover, the rashes appeared as an epidemic, and then were never seen again, looking rather as if they were due to some special cause which was propagated from one case to the others. None of the patients showed any signs of syphilis.

If the rash is due to excretion of irritating products by the skin, one would rather have expected that albuminuria would have been present from their action on the kidneys. No albumen was ever found, however, in the urine. One or two other cases occurred where the discharge became slightly offensive, but where no rash appeared.

Professor Simpson said the contribution was an interesting and valuable one. The subject is not unknown, though little has been written about it. Professor Simpson has observed one or two cases in the Maternity during this quarter. He is not prepared to accept Dr Mackness's explanation off-hand, though it has much in its favour. We frequently meet with clots and decomposing discharges which are not associated with a rash, so, as a cause, we must find something more than a fœtid discharge. The rash looks extremely alarming, but one is comforted by the little amount of fever. Dr Mackness has done good service in recording the cases and in suggesting a theory.

The President said the rashes he had seen after labour had been more measly in character; the patients had little rise of temperature, had no sore throat, and were kept in the ward without bad result. He had seen several cases like measles with no bad symptoms and no fœtid discharge. If anything had been absorbed, the patients would have had pain. As the cases occurred together, they must have had a common origin, and it was a question whether the institution itself had not something to do with it.

Dr Ballantyne had seen two cases distinctly scarlet like, with no albumen in the urine, no strawberry tongue, no desquamation, and no sore throat. One of those patients expelled a piece of membrane. He noticed that a discussion on this subject had taken place in a Parisian society, where the opinion was expressed that this condition was due either to attenuated scarlet fever or to some puerperal condition, probably septic in origin. In a third case he had noted that the eruption on the face was like that in measles.

Dr Rattray had met with a few cases which resembled measles

more than scarlet fever, in which there was an absence of sore-throat or fever, and which in a few days recovered.

Dr Foulis said it was impossible to make a diagnosis from the character of the rash. A rash is a vasomotor phenomenon. Dr Mackness did not refer to desquamation, which is important in diagnosis. The rash does not indicate the nature of the poison. In Dr Foulis's opinion, all rashes result from some poison.

Dr Mackness, in reply, thanked the Fellows for the reception they had given his paper, and said that he had not observed desquamation in any of his cases, and that vesicles had only occurred in one case.

V. TWO CASES OF LABOUR, COMPLICATED BY SHORTNESS OF THE CORD.

By Robert W. Felkin, M.D., Lecturer on Diseases of the Tropics.

At 2 A.M. on Monday, the 28th of November, I was called to see Mrs B., aged 22. Her husband, who came for me, requested me to go with him at once, as his wife had been in labour since 2 P.M. on the previous Saturday (36 hours), and was in very great pain. On arriving at 2.30 A.M., I found the patient in bed, crying out lustily, restless, throwing her arms about, and complaining of great pain in the lower part of her abdomen. She was a small, neatly-built woman, highly nervous. This was her first pregnancy. Her skin was hot and dry, and she also complained of great thirst. Her mother told me that the waters had come away at about 5 P.M. on Sunday, or some nine hours before my arrival.

On making an examination, I found the fœtal head lying on the perinæum. The parts were hot and dry, and the perinæum was stretched, thin, and very rigid. The pains, which I was told had been very regular, were not strong. I then proceeded to palpate the abdomen, the patient locating the pain, which she said was of a sharp, cutting, or biting character, in the right iliac region. I had hardly placed my hands upon the abdominal wall when the patient gave a shriek, and I felt the uterus contract violently; a feeling of a tearing character was communicated to my right hand, the child was shot out into the bed, the uterus relaxed, and I felt as if a tap of water had been turned on inside. Of course I grasped the uterus firmly, and in a short time it contracted well. In the meantime the women who were present had seen to the child, who had been born with the placenta, its birth being accompanied by considerable loss of blood. The hæmorrhage was short in duration, but severe while it lasted. A good deal of blood made its way to the floor, but nearly two chamber utensils full of clots were collected. I gave the patient a hypodermic injection of ergotine with one hand, still controlling the uterus with the other for about twenty minutes, when, seeing that there was no recurrence of hæmorrhage, and that the uterus remained well

contracted, I applied a binder. The patient was very pale, but complained of no pain. She felt faint, and asked for water. The pulse was thready, and she was covered with cold sweat, so I gave her a small dose of whisky, the only available stimulant, and was then able to turn my attention to the child, which had by this time been washed, the cord having been tied and severed by the friends. It was a healthy-looking, but rather small female child, and somewhat feeble. It whined rather than cried. The cord was thick and very short; the two parts, measured by a piece of cotton, were $5\frac{3}{4}$ inches long. It was not inserted into the centre of the placenta, but at the edge. The patient's perinæum was torn almost completely up to the anus; I put in sutures. The patient rallied, and I was able to leave her at about 5 A.M. She has since progressed favourably, except that by getting out of bed on the second day she tore out the perineal sutures, and has refused to have them put in again. There can be no doubt, I think, that in this case the long duration of the labour was owing to the shortness of the cord, and that the insertion of the cord was into that part of the placenta lying nearest the fundus uteri; also that the violent uterine contraction caused the placenta to be torn away. The shortness of the cord was remarkable; it was a case of absolute or natural shortness. A few months ago I had a case which illustrates the other condition, viz., accidental shortness, due to a long cord being twisted; and as it also illustrates another accident to which a cord, either absolutely or relatively short, may give rise, I will, with your permission, briefly refer to it.

A Mrs W., aged 42, came to see me on the 20th of June, and asked me to attend her in her ninth confinement, which she was expecting at the end of the month. From the 22nd of June till the labour took place on the 5th of August, I saw this patient frequently, on account of severe abdominal pain, and also pain at the lower part of the sacrum, which occurred every two or three days, and often prevented sleep—so much so, that I had to prescribe sleeping draughts on several occasions. All Mrs W.'s previous labours had been easy and rapid, but she had always expected labour long before it took place, and in several of her previous pregnancies she had suffered from pain, but it had never been so severe as now. On examining Mrs W., the most noticeable facts were her great size and her swollen legs. At first I thought that I had to do with a twin pregnancy, but came to the conclusion that it was a case of hydramnios, on account of the extreme mobility of the fœtus, the shape of the abdomen (globular), and the well-marked fluctuation. On the 5th of August I was sent for, and on my arrival I found my patient in bed. The os was almost fully dilated; the pains were regular and very strong; and as all the parts were very lax, I ruptured the membranes, and a perfect deluge of liquor amnii took place. Two pains brought the head on to the perinæum; with the next, the child was born; but my

hand, which was following down the child, all of a sudden lost touch with the uterus, which seemed to slip away from my fingers. The face of the child was livid, the cord encircling its neck and chest. I at once severed it, and noticed that it was twisted five times round the neck and once round the chest. The child was apparently still-born, but I told the nurse who was with me to use Schultze's method, and in about five minutes it gave a gasp and soon revived. On examining the patient, I found that I had divided the cord very near its insertion into the placenta, which was slightly projecting from the vulva. On passing my hand over it, I felt a mass completely filling the vagina, which I took to be the uterus. The patient had a rigor and then vomited. I tried to press back the uterus, but without success ; so, as the case was urgent, I removed the placenta, which was attached to the fundus, no very easy task, as it was adherent in places. The hæmorrhage was, however, surprisingly slight. After the placenta was removed, a gush of blood took place, but, owing to the extreme laxity of the parts, I was able to return the uterus with no great difficulty. It went back with a dull thud, almost carrying my hand with it. The patient drew a deep breath, and for a moment I thought she was dead. This was, however, not the case, for when the nurse had dashed some water in her face, she commenced to breathe again, and after an injection of ether she revived wonderfully and seemed quite cheerful. She made a good recovery. I omitted to measure the length of the cord.

In the first case I have related, I do not think that I could have come to any diagnosis of a short cord, as the time at my disposal was too short, and on subsequent inquiry I learnt that the symptoms which might have been expected, viz., pain at the fundus uteri and limited fœtal movements, had not been present. With regard to the second case, I suppose I ought to have expected the possibility of a twisted cord.

Professor Simpson said the first case was extremely interesting on account of its rarity. He had never seen a case with so short a cord. The shorter cords are usually associated with some malformation of the child. The site of the placenta is important, and it would have been well if the position of rupture in the membranes had been noticed. Fundal insertion of the placenta is more likely than any other to cause inversion of the uterus. The cases are of extreme interest, and the treatment is correct.

The President said the first case had one symptom usually associated with short cord, viz., pain at the insertion of the placenta. There was no pulling back of the head between the pains. It was more than probable that the placenta was attached low down. The second case was interesting on account of the inversion. He congratulated Dr Felkin on his treatment of the cases.

Dr Foulis remarked that hæmorrhage in the second case must necessarily have followed. He objected to the expression that the uterus relaxed and then hæmorrhage followed. The uterus has no power of relaxing after its walls have come in contact. It relaxes because of the hæmorrhage.

MEETING IV.—JANUARY 11, 1888.

Dr UNDERHILL, *President, afterwards* Dr FOULIS, *Vice-President, in the Chair.*

I. THE MECHANISM OF THE SEPARATION OF THE PLACENTA, by Dr Berry Hart.

II. THE THIRD STAGE OF LABOUR: A CRITICISM OF PAPERS BY COHN, CHAMPNEYS, AND BERRY HART.

By A. H. F. BARBOUR, M.A., M.D., F.R.C.P.E., Lecturer on Midwifery and Diseases of Women, Edinburgh Medical School; Assistant Physician for Diseases of Women, Royal Infirmary, Edinburgh; Junior Assistant Physician to Royal Maternity and Simpson Memorial Hospital; Inspector of Examinations in Midwifery.

IN reviewing obstetrical literature it is very interesting to notice how now one subject and then another comes prominently forward. If we had before us a bird's-eye view of, say, German, French, Italian, American, English literature, we should note how some topic crops up and, so to speak, holds the field for a time, and that the interest in it then dies down again; and it is very instructive to trace the discussion to its original source. In making a bibliography of recent literature, I have observed that a subject is brought prominently forward by one paper; a second on the same theme in another language soon appears, perhaps expressing the very same ideas; the attention of a wider circle of observers is thus drawn to the question, and we soon have a host of contributions to the literature if not to our knowledge.

The Third Stage of Labour has for the last seven (and especially for the last three) years excited an unusual amount of interest. Up to 1880, the principal real contributions to our knowledge group themselves round the following dates and names:—*Baudelocque*[1] (1781), *Credé*[2] (1853), *Schultze*[3] (1865), *Lemser*[4] (1865), *Duncan*[5] (1871). All of these papers dealt only with the physiology and management. The anatomy, which forms the foundation of these, had not been touched.

[1] "L'Art des Accouchements."
[2] *Klin. Vortrag. Ueber Geb.*, 1853.
[3] "Wandtafeln zur Schwangerschaft und Geburtskunde."
[4] *Die physiologische Lösung des Mutterkuchens*, Giessen, 1865.
[5] "On the Mechanism of Expulsion of the Placenta," *Edin. Med. Jour.*, April 1871.

In a paper which I read a few months ago, I took up the anatomy and some points in the physiology. In this paper I wish to deal with the three most recent contributions on the physiology. The three contributions are by Cohn, Champneys, and Berry Hart respectively. Cohn's is based on a large number of observations made on patients while the Third Stage was going on; he passed the hand *into the uterus* to ascertain when and how the placenta was separated. Champneys' paper is based on observations made in the same period; he passed the hand into the vagina, and stained the first part that presented at the os uteri. He also measured the quantity of blood lost. Hart's paper starts with the behaviour of the placenta in placenta prævia, which has suggested to him a new view of the mode of separation of the normally situated placenta.

Cohn's paper[1] forms an important contribution to the physiology. He gives the result of the examination of a large number of cases in the Berlin Maternity while he acted as Schroeder's assistant there.

The first point he takes up is, *When does separation begin?* and he writes as follows:—"It is very difficult to determine the point of time, because when we pass the hand into the uterus (when possible past the lower extremities being born) we can feel very frequently one piece of placenta projecting into the os externum. . . . While Lemser in 71 per cent. of his cases could feel the placenta immediately after the expulsion of the child separated in the os externum, and only in four out of 168 (of which in two cases the placenta was separated before the commencement of the pains of the Third Stage) did some time pass till this happened; while Schroeder-Stratz in only four out of 120 cases[2] found the placenta still adherent after the birth of the child; I have come to different results. *I succeeded in a whole series of normal cases, when the period of expulsion proceeded gradually, in establishing adhesion in toto.* When the head came over the perineum, I extracted the trunk very slowly, and found (1) in every case that the uterus drew itself together gradually, as if following the child, without any pain; (2), then I found, on immediately passing the hand in, the placenta folded (something like Schroeder-Stratz's section), without any central or lateral bulging. The same observation I could make on finishing gradually several breech presentations and a great number of extractions after term. *Every time I found the placenta attached through its whole extent in its characteristic folded form.*"

[1] "Zur Physiologie und Diätetik der Nachgeburtsperiode," *Zeit. f. Geb. u. Gyn.*, Bd. xii., Hft. 2.

[2] This mode of putting it is misleading. What Stratz says is,—"In only four of 120 cases in which the hand was passed into the cavity within two minutes after the birth of the child was there no separated *part* of the placenta sticking through the contraction ring." The italic is ours. Reference to the case which I gave in my last paper will show that the lower edge of the placenta may project free while the rest of it is unseparated.

I have italicized the most remarkable statements in this paragraph—remarkable because they contradict *in toto* the results of Lemser, which have hitherto been taken as the basis of our knowledge of the physiology of the Third Stage.

As to the *cause of separation*, he says that the chief factor is the "Pains of the Third Stage," in which we entirely agree with him. But when he describes the *mode* of this as by the production of a hæmatoma and the part the latter plays in the Third Stage, he enters upon debatable ground. He gives up the idea of there being a uterine cavity into which the placenta can be made to bulge by the uterine contractions. In my paper on the "Anatomy of the Post-partum Uterus" I had pointed out the erroneousness of this conception, as follows:—"After the fœtus has been expelled, we are liable to think of the uterus as an empty cavity, and this gives rise to erroneous deductions; thus Ahlfeld speaks of the placenta as bulging into the uterine cavity. Plate III. (which shows the uterine walls in contact with the placenta all round) gives us a more correct conception of the condition. The anterior uterine wall rests on the placenta, just as the posterior one does; if the placenta were made to bulge, it would press the posterior wall back as much as it pressed the anterior one forwards." Thus it is evident that a hæmatoma will not form during a pain. This is also Cohn's conclusion, for he says: "The centre of the placenta did not raise itself during a pain. It is evident why this did not happen, when we make clear to ourselves that in a general contraction of the uterus no uterine cavity can form; both uterine walls are kept from contact with each other by the placenta only, and thus the placenta is held pressed between the uterine walls with a force proportioned to the pain." Thus far quite right. What he says is a repetition in other words of what we said above; but he goes on,—"With a diminution of the pain the conditions at once change; the uterus becomes flaccid, the placenta as far as it is separated (in this case at its centre and lower border)"—referring to a case just mentioned—"sinks by its own weight into the uterine cavity which it forms for itself by pushing the lax walls forward; at the same time the retro-placental space is by aspiration filled with blood. The quantity of blood enclosed on all sides is not large; normally there comes out only so much blood as is necessary to fill the empty space. The normal blood-pressure is insufficient actively to lift the placenta further, and at the same time to lift the apposed uterine wall." There is evidently some confusion of ideas here. It is not quite clear whether it is the action of gravity drawing the placenta downwards and producing a vacuum or the blood-pressure alone which causes the blood effusion. We note, however, that Cohn takes up an entirely new ground as to the time and mode of production of the hæmatoma. The uterine contraction has nothing to do with it; it does not form as the result of bulging into a uterine cavity while a pain is on; nor does it form in the interval as the result of the placenta's having been pushed onward by the

pain : it is due to the *weight of the placenta* favoured by the blood-pressure. Now there is no evidence whatever that the placenta sinks downwards by its own weight. (We assume, of course, that the patient is lying on her back, and that the placenta is *in situ* inside the uterus, not in the vagina.) Nor could it do so, even supposing a patient were erect, because it is assumed that it is only in part separated. I do not understand what he means by his reference to the blood-pressure, unless it be that if the vessels not being closed by the contraction and retraction of the site, there will be bleeding from the raw surface on the separated area, which is self-evident.

He mentions some interesting facts with regard to turning. "Most frequently after turning, with careful extraction, he found the placenta still attached." He believes that asphyxia and death in turning are not due to separation of the placenta, but to pressure on the cord. In 30 cases he paid special attention to this, and in all except one found there was no hæmorrhage.

With his general conclusion, "that the pains of the Third Stage by themselves alone produce the separation of the placenta," we entirely agree. It is interesting also to note that he does not believe that any change in intrauterine pressure, such as Stratz maintained, causes separation of the placenta. Thus he says, to repeat, "it is the pains alone which do this, apart from the passive diminution of the uterine wall and the supposed changes in pressure post-partum."

Champneys has recently made a very important contribution to the Study of the Mechanism of the Third Stage of Labour, in three papers read before the London Obstetrical Society, and reported in the Transactions of that Society for March to July 1887, to which the pages quoted refer. The third of these papers, which treats of the Separation and Expulsion of the Membranes, does not concern us at present. For the benefit of those Fellows who may not have seen the London Obstetrical Transactions for these months, I must, before proceeding to criticise Champneys' views, give an abstract of his first two papers.

With regard to the Separation of the Placenta, he gives a comprehensive statement of our present knowledge with a criticism of the views of different observers; and in treating of its Expulsion, he in addition brings forward the result of a large series of original observations which he has made.

In summing up our present knowledge, he draws attention to the well-known clinical fact that, while the child's head may be born an indefinite length of time without asphyxia, yet when it is fully born we observe that after some interval it becomes suddenly livid. This he ascribes to commencing detachment of the placenta. He then gives the results of Lemser, who found in 120 out of 168 cases the lower edge in the os uteri immediately after delivery, in 38 more within 9 seconds, and in no case any attachment after the birth of the child. He accordingly concludes that "the normal

detachment of the placenta, if Lemser's observations are correct, is therefore complete at the end of the Second Stage of Labour."

He next takes up the facts derived from operations on the pregnant and parturient uterus, quoting eight cases from Ahlfeld, Leopold, Sänger, and myself. With regard to these, he concludes that the conditions are altogether too unnatural to argue from, whether as regards bleeding from the placental site or the behaviour of the site in normal cases. Uteri from these operations, he says, are very different from uteri at the end of the Second Stage[1]:—"One point, however, seems to us not to have been remarked, and that is, the strange contrast between the uterus at the end of the second stage of labour and the uterus after Cæsarean operation:

1. At the end of the second stage of labour the uterus is "up to the navel;" it is not markedly flattened from before backwards, and the placenta is already detached according to the only observations we possess—those of Lemser.

2. A uterus after Porro's operation is certainly not longer, probably considerably shorter; it is markedly flattened from before backwards, and the placenta is firmly attached."

And a few pages further on,[2] in criticising the Porro uteri, and while admitting that in them the placental site may retract to an area of 4½ in. by 4¼ in. without in any degree detaching the placenta, he says,—"It is not known, and it would be hard to ascertain, what is the actual size of the placental site at the end of the second stage in normal cases of labour, at which time it would appear, from Lemser's observations, that the placenta is completely detached. This detachment seems to take place at this time, whatever the size of the placenta and its thickness, and therefore stiffness, may be . . . . . We know also that, practically speaking, the detachment of the placenta is absent or extremely imperfect until after the birth of the child is complete; as soon as this is complete we have also complete detachment of the placenta, whatever its size, if Lemser is correct."

He next classifies and then criticises the theories of the cause and mode of placental detachment, as follows.

As to cause: A. By contraction and retraction alone, through reduction of area of placental site (Baudelocque, Duncan, Schultze, Dohrn). This, he says later on, is a *vera causa*, in support of which position he refers to the method of procuring separation by exciting these.

B. By contraction and retraction indirectly, *i.e.*, by aspiration, squeezing of blood towards the surface, rapid diminution of intra-uterine pressure consequent on birth of child (Ahlfeld). He rejects aspiration because there is no evidence of firmer attachment round the edge, and because contraction of site would increase initial concavity of placenta, not make it bulge in opposite direction. There is no evidence of squeezing of blood towards surface, except retardation of fœtal pulse during a pain;

[1] P. 126. [2] Pp. 133, 134.

but rapid diminution of intrauterine pressure is probably a *vera causa*, though subsidiary. "In favour of it may be alleged the cases of placental detachment and flooding which sometimes follow the too rapid evacuation of the uterus, especially in powerless labours in feeble multiparæ with dilated passages, when the uterus is unusually *large* at the time. Mere evacuation of the waters while the fœtus is still *in utero* (as in neglected shoulder cases), is not usually competent to effect this detachment—witness the cases in which children are born alive under such circumstances. This seems to point to detachment not taking place from rapid evacuation alone unless the internal surface is capable of rapid diminution simultaneously."[1]

C. By detrusion (Lemser, Barbour, Ruysch). In criticising detrusion, he says,—"It is upheld by Barbour by a process of elimination of other theories, but, as it seems to us, on insufficient grounds. Lemser founded his belief in this process on experiments on rabbits which cannot be applied to the human female. Barbour introduces his belief *à propos* of a consideration of uteri removed by Porro's operation, which we also cannot accept as evidence, for reasons given above.

"Moreover, such a process of detrusion, though conceivable when the placenta is implanted on the front or back wall of the uterus, and expelled edgeways (according to Duncan's description), is hardly conceivable in fundal attachments without the formation of a sub-placental hæmatoma and expulsion of the placenta, fœtal surface onwards and partially or entirely inverted, both of which details are rejected by Barbour. This question is intimately associated with that of the *expulsion* of the placenta, which we are not now considering.

Lastly, it presupposes the absence of any uterine cavity, deduced by Barbour from a consideration of uteri removed by Porro's operation. Evidence derived from this source is not to be accepted unless in accordance with known clinical phenomena, as we have above said."[2]

He then declares the facts from Porro uteri not to be in such accordance,—the "known clinical phenomena" have been already given by us in the first quotation.

The modes of detachment are thus classified and criticised:—

A. *According to situation of placenta* (Baudelocque).—This, he says, is not founded on direct observation, nor is it probable that site determines entirely different modes of detachment.

B. *From edge* (Ribemont), based on experimenting with a clay placenta on a sheet of india-rubber, and only operating when adhesion of placenta is uniform and retractility and contractility act regularly. Champneys had come to the same conclusion from behaviour of pasteboard discs fixed by paste on an india-rubber bag, but says that we have neither uniform adhesion nor uniform contractility and retractility in nature.

[1] Pp. 135, 136. [2] P. 136.

C. *From centre* (Solayrès and Ahlfeld), already rejected under aspiration.

D. *According to firmness of attachment of its several parts* (Ribemont).—This view is accepted as philosophical.

The great question is whether separation is independent of rupture of the utero-placental vessels as a cause. "The view that contraction and retraction of the placental site is the great cause of the separation of the placenta is confirmed by all our clinical evidence;" and he begins the next paragraph with—"It is certain that between separation of any part of the placenta and the retraction of the corresponding part of the placental site, there must be a period, however short, during which hæmorrhage may take place."[1] He rejects Dr Matthews Duncan's view that separation is unattended with hæmorrhage, and says, "We cannot . . . . quite accept the view that an absolutely bloodless third stage of labour would be ideal. It seems to us more in accordance with physiology to say that the ideal process would be one in which just so much blood should be lost as would make the difference between the presence and absence of a gravid and non-gravid uterus—between the uterine circulation before and after delivery."[2]

And he concludes,—"In the meantime, certain facts concerning the size and shape of the uterus *at a time when the placenta is known to be detached*,[3] point in the direction that hæmorrhage to a moderate amount, or rather rupture of the utero-placental vessels from vascular causes, and not only from the retraction and contraction of the placental site, plays a certain though subsidiary part in the mechanism of the detachment of the placenta."[4]

This short abstract will enable the Fellows to follow the drift of his first paper, and I have quoted in full passages which are open to criticism. In the first place, we cannot regard the fact that the child's head becomes asphyxiated while lying outside the vulva as proof that placental detachment has begun; for this result would be equally produced by compression on the cord or interference with the circulation of the placental site, the result of retraction without separation.

He takes Lemser's observations as the basis of his conclusions: at first, as you will have noticed, provisionally (p. 134, "It would appear from Lemser's observations. . . . . If Lemser is correct"), but afterwards as final (p. 141, "At a time when the placenta is known to be detached"). In my last paper, I showed that there is reason to doubt the conclusiveness of Lemser's observations, a position which is strengthened by Cohn's results just brought before the Society.

With regard to the difference between the shape of the Porro uterus and that of the uterus clinically during the Third Stage, I referred to that point also in my last paper; but I may again

[1] P. 139. [2] P. 140. [3] The italics are ours. [4] Pp. 140, 141.

mention that the clinical Third Stage uterus between the pains is somewhat flattened antero-posteriorly, and that the antero-posterior flattening of the Porro uterus is increased by the process of preparing Porro uteri for making sections. Like any other tissue, the post-mortem uterus is flaccid, and settles and spreads itself out upon the flat surface on which it is laid during gradual hardening.

I do not see the principle upon which he classifies the theories as to the cause of placental detachment. He makes three groups: A. By contraction and retraction *alone*, through reduction of area of the placental site, and he cites Baudelocque's expression—"The womb is the principal agent; its action alone produces the separation of the placenta;" as also Duncan, Schultze, and Dohrn.

B. Contraction and retraction *indirectly*—causing (*a.*) aspiration; (*b.*) squeezing of blood to surface; (*c.*) rapid diminution of general intrauterine pressure.

C. By detrusion.

Now, detrusion should not thus be placed on the same line of division as contraction and retraction, for it, equally with "diminution of placental site," "bulging of placenta producing hæmatoma, etc.," is one of the results of "contraction and retraction:" just as a child is not "extruded" *without* contraction and retraction in the Second Stage, so the placenta is not "detruded" without them in the Third.

A more systematic classification would be—

1. Contraction and retraction operating at the placental site alone:

(*a.*) By diminution of its area alone;

(*b.*) By causing the placenta to bulge, so that a vacuum is produced (into which the atmospheric pressure forces blood);

(*c.*) By squeezing the blood to the surface.

2. Contraction and retraction operating, not only at the site, but all over the uterus, in virtue of the fact that the uterus grips the placenta all round.

You will notice that we have omitted Champneys' B. *c.* This, if it occurred, could not be the result of contraction and retraction during the Third Stage (which would increase rather than diminish intrauterine pressure), but would be the result of the pains of the Second Stage. In criticising Stratz's paper, we showed that there is no evidence that there is rapid diminution of intrauterine pressure on the birth of the child; and if there were, it would cause inversion of the uterus, not detachment of the placenta from its wall.

I did not use the term "detrusion" in my first paper, nor do I think it advisable to do so unless we agree upon a definition of the term. Champneys says that I "adopt the view that separation is due to detrusion *alone*," while even adopting the term "detrusion" (which I do not), the expression that I used was, "These preparations point to the third as the *chief* factor." I must confess that the remarkable and entirely new fact, that diminution might take place to so great an extent without separation made

me under-estimate the effect of contraction and retraction at the site; but I believe now that this latter plays a considerable rôle, if not in actual separation, at least in preparing the way for it by loosening the connexion between the placenta and the uterine wall. Champneys also says that I reject the formation of a sub-placental hæmatoma and the expulsion of the placenta fœtal surface first in a fundal attachment, although in my first paper[1] I say that it is just with a fundal attachment that we might have this happening; and in a subsequent paper[2] I draw attention to the relation of fundal attachment and hæmorrhage as a subject specially worthy of investigation.

In his second paper—"On the Expulsion of the Placenta"—Champneys gives the results of 70 most carefully recorded observations made on patients at the London General Lying-in Hospital. The presenting part of the placenta was stained with eosin, and measurements taken to give the position of the stain on the placenta and the position of the rent of the membranes (which gives us roughly the position of the placenta in the uterus). The quantity of blood lost before expulsion of the placenta and with it was also recorded. The whole results are given in an elaborate table, which forms an important contribution to the physiology of the Third Stage of Labour.

The facts recorded in the table are very valuable and worthy of study, but I question whether they bear out the conclusions of the paper. The first important result which he establishes is that in the great majority of cases (59 out of 69) a point on the fœtal surface within two inches of the lower edge presented. "This mode of presentation," he says, "cannot be accounted for by hitching up through resistance to the detachment of the membranes by the lower edge of the placenta, as Dr Duncan infers, for the upper edge would find the same obstacle (resistance to the detachment of the membranes) to its descent." As to the conclusion, that a point within two inches of the lower edge of the placenta presents, we have nothing to say. It is, however, noteworthy that it is a rare occurrence for a higher point to present. Now, presentation two inches from the edge shows an amount of inversion scarcely worth the name. It is certainly not the inversion described by Baudelocque and figured by Schultze. Nor is his reply satisfactory to Matthews Duncan's statement that this small inversion is due to hitching of the membranes: for adhesion of the membranes at the upper edge will act quite differently from adhesion at the lower—at the upper end simply retarding descent, at the lower edge both hitching and retarding.

[1] "The Anatomy and Relation of the Uterus during the Third Stage of Labour, etc.," *Edin. Med. Jour.*, Sept. 1884, p. 237.

[2] "The Membranes in the Third Stage of Labour," *Edin. Med. Jour.*, June 1885, p. 1089.

His inquiry, however, specially relates to two points,—(1.) The relation between the point of the placenta which presents and the position of the placenta *in utero;* and (2.) The amount of blood lost.

As to the first of these, whether there is any relation between the point on the placenta which presents and the position of the placenta in the uterus, he draws up the following summary from his detailed table, in which A = average height of presenting part, and C = shortest distance from the edge of the placenta to hole in membranes (we omit his columns B and D as not essential):—

	A.	C.
(1.) Presenting part of placenta within 1 inch of its lower edge (23 cases),	¾ in.	3½ in.
(2.) Presenting part of placenta between 1 and 2 inches of its lower edge (19 cases),	1¾ in.	4 in.
(3.) Presenting part of placenta between 2 and 3½ inches of its lower edge (9 cases),	2¾ in.	5¼ in.

"It will be seen," he adds, "that a steady increase is noted in column C, which represents the lowest part of the placenta. In other words, *the presenting part varies its position with the position of the placenta. The higher the placenta, the higher the presenting part, and* vice versa."

Here there is used the method of averages, of which we shall have something to say immediately. But even supposing that we were to accept that method as valid here, we should need to add to this summary a fourth group of his cases—those presenting by the edge itself or amnion below it; which group gives an average height of insertion (3·8 in.) higher than the group of cases which present by a point between the edge and 1 inch above it (3·5 in.). This fact disturbs the "steady increase" of the summary, which, thus completed, runs as follows:—

	A.[1]	C.
1. Presenting part of placenta edge or amnion below the edge (16 cases),	0 in.	3·8 in.
2. Presenting part of placenta within 1 inch of its lower edge (23 cases),	¾ in.	3·5 in.
3. Presenting part of placenta between 1 and 2 inches of its lower edge (19 cases),	1¾ in.	4 in.
4. Presenting part of placenta between 2 and 3½ inches of its lower edge (9 cases),	2¾ in.	5¼ in.

[1] Champneys' position is, let me again point out, that as A (average height of presenting part) increases, C (height of insertion) should also steadily increase.

But we do not accept this line of reasoning as valid here. For, as has been said, in the inquiry as to the presenting part of the placenta and the amount of blood lost, the method of averages is applied. This method is applicable only when the extent of variation is small in proportion to the resulting average, and so distributed that the number of cases below the average does not differ greatly from the number above. Where the conditions are not fulfilled, the method of average gives distorted and even untrue results. In such a case only the detailed statement gives an adequate view; and I have drawn out the following summary of this extremely valuable table of cases, giving height of placenta for every half-inch, and height of presenting point above edge of placenta for every quarter-inch.

Table showing the relation between height of Placental Insertion and height of Presenting Point above the edge of the Placenta.

Height of Placental Insertion.	Number of cases at each Height of Presenting Point above lower edge of Placenta.														Total number of cases at each Height of Placental Insertion.
	0 in. or below edge.	¼ in.	½ in.	¾ in.	1 in.	1¼ in.	1½ in.	1¾ in.	2 in.	2¼ in.	2½ in.	2¾ in.	3 in.	3¼ in.	3½ in.	
0 inches.	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
1 ,,	4	1	...	...	...	2	...	1	...	...	...	...	...	...	...	8
1½ ,,	1	...	2	...	...	...	...	...	...	...	...	...	...	...	...	3
2 ,,	1	...	...	1	1	...	1	...	...	...	...	...	...	...	...	4
2½ ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3 ,,	1	...	...	...	4	...	1	...	2	...	...	...	...	...	1	9
3½ ,,	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	2
4 ,,	2	...	1	2	1	1	1	...	1	...	1	...	...	...	...	10
4½ ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5 ,,	2	...	...	1	...	1	1	...	3	1	1	1	...	...	...	11
5½ ,,	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	2
6 ,,	...	...	1	1	1	1	...	...	1	...	...	...	1	...	...	6
7 ,,	1	...	...	...	...	...	...	...	1	...	...	...	1	...	1	4
8 ,,	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	1
9 ,,	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Total number of cases at each height of presenting point above lower edge of Placenta.	16	1	5	5	7	5	5	1	9	1	3	1	2	...	2	63 cases.

A study of this table will show that there is by no means a uniform relation between the height of the presenting point on the placenta and the height of the placenta's insertion on the uterus. The first column shows those cases which presented by the edge or below, and we find that these include placentæ at almost every height of insertion from the lowest (in which the edge was 0 inches from the rent) to the highest (in which it was 9 inches from the rent). Similarly, we find that placentæ situated a medium distance up the uterus, say the horizontal lines for 4 in. and 5 in. (there are none at 4½ in.), we find on both of these lines placentæ presenting by almost every point from the edge itself to 2½ inches above it.

The failure of the method of averages is more obvious in the inquiry as to the amount of blood lost. Champneys finds an average of 12 oz. by taking the total loss in all the cases and dividing by the number of cases. Setting aside 3 cases in which no amount is recorded, we have 67 cases left. These cases fulfil neither of the conditions under which the method of averages is applicable and useful. In the first place, the differences are not so equally distributed that the number of cases below the "average" is about the same as the number above it; for we have 45 cases below to set against only 20 cases above. This inquiry presents a case analogous to that of reporting on the height of a community. It would be manifestly misleading to take the total heights and divide by the number of individuals to give a so-called average height; for we might have a great majority of the people somewhat below the average, and a minority of exceptionally tall individuals above it; so that such an average would convey a most erroneous impression of the actual stature of the community. The only instructive way of looking at the height of a population as a whole would be to seek for a *mean* height—that stature which would most nearly divide the community into two equal parts, so that about the same number of the population was above and below the mean respectively. An average in such a case gives a purely hypothetical result, that had the gross total been equally distributed the men would have been of a certain height; the mean, as above described, states an actual fact about the real case. It would, of course, be better still to have a more detailed classification.

In the second place, the extent of variation in the different cases, far from being small in proportion to the resulting average, is very great indeed. In a few cases the loss was very considerable—in 7 from 30 to 38 oz., three times the average; and it is these which bring this latter up to 12 oz. It is doubtful whether cases of excessive loss should be included at all. A practitioner whose daily round of practice was only about three miles would by his four weeks' holiday at the Washington Congress add 6000 miles to his total journeyings during the year; but there would be a touch of humour were he to divide this total by the number of days in the year, and say that his daily round averaged twenty miles.

Berry Hart in his paper[1] brings forward a very novel theory of the mode of separation of the placenta. He makes several statements which are open to criticism. He says that we know that diminution in the placental site does not separate the placenta—a fact which (he says) my preparations demonstrate; but we cannot let this pass without qualification. These preparations show only that diminution up to a certain point (4 in. by 4½ in.) takes place without separation. It is quite evident that there must be

[1] "Note on the Mechanism of the Separation of the Placenta, etc.," *Ed. Med. Jour.*, July 1887.

a theoretical limit beyond which diminution cannot go without separation; and it is quite possible, though not yet proved, that 4 in. by 4½ in. comes near this limit. We might go a step further and say that diminution up to 4 in. by 4½ in. may prepare the way for separation, but of this in another paper.

Further, he says the detrusion theory is plausible, and that he has advocated it, but gives it up now for the following reasons:— "We find in some cases of adherent placenta the lower part of the placenta separated and not the upper. The separation of this lower part is not a detrusion. In abortion cases I have seen the whole membranes separated, and only adherent at the fundus uteri." This assumes that the detruded body in these two cases is rigid, which it is not. Were the placenta or ovum in abortion like a hen's egg, it is self-evident that the lower end of the egg could not move in the slightest degree while the upper end was fixed. But any one who has handled a fresh placenta or a recent abortion knows that they are both compressible and capable of elongation. If a body of such consistence in a flaccid tube and adherent be pushed onwards by squeezing the walls, it does not at first slide *en masse;* but the lowest edge of it first gives or yields, as being in the direction of the pressure and also the line of weakest resistance. In my first paper, describing the action of the uterus on the placenta, I hinted at this. The placenta, I said, is "*surrounded on all sides by a resistance which is equal except along one line,* viz., that running through the plane of contact of the anterior and posterior walls of the lower uterine segment below the placenta."

With regard to this question, Case VIII. in my former paper is of interest. Here the lower part moved downwards while the upper was still adherent. This objection to the detrusion theory was also brought forward by Matthews Duncan in the discussion of the London Obstetrical Society on Champneys' paper. "A Porro example had been recently exhibited by Dr Galabin, in which the lowest part of the cake had been separated, and this had been held as evidence of detrusion. Now, he held that it was hostile to the detrusion theory, for he could not imagine detrusion pushing off the lower flap without pushing off all above it. How could the lowest part be propelled by a part above which was itself not moved?" Now, while we have no direct proof in support of the detrusion theory, I must say that this interesting fact, far from being hostile to it, would tend to make one a believer in it; for (as has been just said) this is exactly the way in which one should expect a body like the placenta to behave.

In his "Probable Mechanism of Separation" Hart says,—"The placenta separates, not from diminution of the placental site, but during the expansion in area of the site after retraction;" and again, "When the placental site increases in area after retraction . . . . ." Retraction is here evidently a misprint for contraction, for there is no increase in area after retraction, inasmuch as that term

includes the retention of diminution in area after contraction has passed off as well as continuous diminution independent of contraction. "Contraction," says Matthews Duncan, "is temporary; retraction is permanent and progressive." Taking, then, the meaning here to be "expansion after contraction has passed off," no evidence is given that the placenta cannot follow very slight increase of its site—very slight, because the site does not expand to anything like its former area, as retraction prevents this.

In the same paragraph is given a second explanation of increase in area of site after the contraction has passed off, which we must keep quite distinct, viz., the return of blood to the placental site. "The fœtal portion has been aspirated by the child, and the uterine muscle must increase in bulk more rapidly than the placenta, as the blood returns to it first." There is no evidence that the maternal portion of the placenta has the blood driven out of it by a pain; the uterine muscle is rendered anæmic, as frozen sections tell us, but no proof has been advanced that the maternal placenta becomes so. If one were to theorize, it appears as if just the opposite would happen—that the muscle contracting and forcing the blood out of it would make the placenta more turgid, and increase in bulk during a pain.

The chief objections to Berry Hart's theory may be thus summarized:—

1. Inasmuch as the spongy character of the placenta allows it to follow a diminution of its site from (say) 7 in. by 7 in.[1] to $4\frac{1}{2}$ in. by $4\frac{1}{2}$ in., it will surely allow the placenta to follow any slight expansion when contraction passes off.

2. If this theory were correct, the placenta should be separated by the relaxations after the contractions of the First and Second Stages. To this objection he answers, that in these stages the fœtal circulation allows the placenta to re-expand, but that during the Third the cessation of this changes the conditions. To this I reply—

3. That the placenta remains attached where the fœtus has died before labour and where consequently the fœtal circulation has ceased, as is seen in the frozen sections by Schroeder and myself.

After a careful consideration of these three papers, I see no reason to depart from the position I had been led to take up:—[2]

"1. *The question of separation of the placenta must be kept quite distinct from its expulsion.*

"2. *Evidence is accumulating that, at the commencement of the third stage, the placenta is still as a whole or in great part attached.*

[1] I take this from my frozen section of the First Stage of Labour—"Sectional Anatomy of Labour," *Edin. Med. Jour.*, 1887.

[2] See "Sectional Anatomy of Labour, Third Stage," *Edin. Med. Jour.*, 1887.

"3. *Diminution in area of its site to* 4 *in. by* $4\frac{1}{2}$ *in. does not mean separation of the placenta.*

"4. *Diminution in area beyond that* + *the action of the uterus as a whole on the placental mass, I regard as the formal cause; the pains of the third stage as the efficient cause of separation. Blood effusion is an accident,* i.e., *not essential.*

"5. *During the contractions of the third stage the surface of the placenta is thrown into heights and hollows; the heights do not necessarily mean effusion below.*

"6. *The placenta descends usually with its edge or a point near its edge first, as Duncan described; sometimes fœtal surface first, as Baudelocque and Schultze described.*

"*The third stage I regard as a second labour in miniature. After the pain that expels the child comes a pause, during which the placenta is still as a whole or in great part attached; then labour comes on again, and the placenta is first detached and then expelled. This second labour is not always marked off by a distinct interval from the first, sometimes one long pain expels the child and then detaches and expels the placenta.*"

Professor Simpson said he had listened to a clear exposition of theories of the separation of the placenta. In his mind he had always thought that the placenta was passive, that the uterus contracted on it as a foreign body which got detached, and was pushed down. Professor Simpson objects to Dr Hart's statement that the fœtal circulation is diminished before the placenta is separated, that as long as the fœtal circulation is going on, no separation takes place. In cases where the child has died *in utero*, the phenomenon goes on as usual, which makes Dr Hart's theory difficult to accept off-hand. Professor Simpson does not see why, even though the placental circulation is at an end, the placenta should not expand and retract with the uterus. Dr Hart's practice during the third stage of labour does not differ from that of most of us. The Credé method was recommended to prevent traction, and to remove the placenta by pressure. The method has been pushed too far, and the middle course should be followed, as too hasty expulsion may result in the membranes being left behind. One can sometimes imagine that one feels the separation going on. Practitioners do no harm in adding to the uterine force in the third stage any more than helping the uterus during the second. When hæmorrhage is present, complete separation should be got by external compression of the uterus, in imitation of the natural method.

Dr Milne Murray had listened with much pleasure to the papers by Drs Hart and Barbour. He regarded Dr Hart's views of much interest, but thought that his position was open to criticism. He thought, for example, that Dr Hart had overlooked

the fact that the walls of the vascular system of the fœtus, placenta, and uterus were elastic structures, and that he could not apply the laws of the distribution of fluid pressures in rigid vessels to such structures. It seemed to him that Dr Hart had done this in his paper. Dr Murray then described two experiments he had made with the view of ascertaining whether there was any evidence of a *positive* force exerted during the relaxation of non-striped muscle. He had failed to obtain any such evidence, and in the absence of such force, he did not see how Dr Hart's opinion as to the mechanism of placental separation could hold. He suggested that if Dr Hart's view as to the separation of the placenta were the correct one, he might prove it experimentally by connecting the umbilical cord, immediately after separation of the fœtus, to some source of fluid pressure, which would take the place of, and perform the function of the fœtal circulation. If the views advanced were correct, such an appliance should have the effect of preventing separation of the placenta for an indefinite period, because, while it would permit of the emptying of the placental vessels on the fœtal side during a contraction, it would serve also during relaxation to restore the fluid and preserve the relative size of the placenta and its uterine attachment.

Dr Freeland Barbour said the existence of the trabecular layer at the placental site is doubted by many observers. In the membranes of the full-time uterus he has not found the spongy layer so well marked as is often described, and thinks the spaces are the consequence rather than the cause of separation. There is no proof that the blood pressure presses the placenta against the wall of the uterus. There is also no evidence that the fœtal circulation affects the separation of the placenta; indeed, the evidence from frozen sections tells against Dr Hart's theory, as in two out of the seven frozen sections from labour (Schroeder's and his own from the first stage) the fœtus had been dead, and yet the uterine contractions had not separated the placenta.

Dr Thomas Wood said the fact of the fœtus being dead would not go against Dr Hart's theory, because the pressure in the fœtus and the placenta during life is the same as when the child is dead *in utero*, or in other words, the fœtal and placental blood-fluid resistance is the same immediately after death as it is before, but on the fœtus being expelled, there is a diminution of the pressure, because the uterine pressure on the child is removed, and so a certain amount of the fluid in the placenta will be driven into the child. Dr Hart and Dr Barbour agree on the fact that the lower part of the placenta separates first, and each explains it according to his own theory. Now, what bearing does the fact that the fœtus is sometimes expelled within the entire membranes have on these two theories? Dr Wood thinks it would seem to favour the theory of Dr Barbour. Sometimes you have the child born, and the placenta immediately following it, and all this taking place

during a single pain. Under such circumstances there has been no retraction, or, as Dr Hart calls it, diastole, to account for the separation of the placenta.

Dr Foulis did not believe that muscular fibre, either in the uterus or in the bladder, or in the intestines, or in the heart or elsewhere, had the power of *forcibly* relaxing after it had once contracted. It did not contract in more ways than one. During the later months of pregnancy the uterus was constantly contracting with force, and then gently relaxing. Dr Foulis held the view that this so-called relaxation of the uterus was a passive elongation of the muscular fibre, brought about by the filling and distension of the uterine sinus and bloodvessels in the substance of the wall of the uterus. After the urinary bladder had contracted to completely empty itself, it did not forcibly relax so as to make a hollow viscus of itself. It had no power to do such a thing, but it was only distended again by the hydrostatic force of the urine trickling into it through the ureters. In the same way the uterine sinuses had no power of active dilatation after they had once contracted, but were filled and distended with blood by the pumping force of the left ventricle of the heart. If, after their walls had once come in contact by contraction of the uterine wall, this blood supply was suddenly cut off, they could not again dilate. They would remain closed until air or fluid dilated them. In the same way, after the placenta has been expelled, if the inner surfaces of the uterus have once come in contact with each other, provided no air has entered through the vagina, the uterus could not again so relax as to produce a vacuum. There was no such power in the muscular fibre of its walls that could cause it to forcibly dilate and overcome atmospheric pressure. It could only be dilated and distended by blood pouring into its cavity, so as to separate its walls, and this blood was forced into it through the open sinuses in its muscular wall by the pumping power of the left ventricle of the heart. It was simply ridiculous to say that the uterus forcibly dilated by means of its muscular fibre, and thus aspirated blood into its cavity. After it had once contracted in such a way that the sinuses in its wall and its own cavity were obliterated, these sinuses and its own cavity could not again be brought into existence except by the distending force of the blood pumped into them by the left ventricle of the heart. As regards the expulsion of the placenta, it seemed to Dr Foulis that the process could be explained in a very simple way. The placenta was a large mass attached to the inner surface of the uterus, and remained, comparatively speaking, undiminished in size, while the uterine wall to which it was attached was continually diminishing in size. The central part of the attachment of the placenta was in this way, as a rule, first detached; and blood pouring in between it and the uterus at the separated part produced the retro-placental clot, which being greatly squeezed upon, was forced

out of the uterus under the edge of the placenta at one part or another, and the free margin of the placenta, generally the lowest, was the first to escape from the uterus in the way Matthews Duncan had shown. As two pieces of matter could not occupy the same space at the same time, as the uterus went on contracting the placenta must be expelled at last from its cavity. Provided air did not get into the uterine cavity through the vagina, and this could not take place as long as the vaginal walls were in contact, there was no space between the uterus and the placenta—the former closed upon the latter at every point. Hence it was impossible that the placenta could produce a retro-placental clot by aspiration. It was astonishing that any one should have suggested such a thing.

Dr Berry Hart said the Society was indebted to Dr Barbour for his able criticism of various authors. Dr Barbour says there is no trabecular layer, but Dr Hart has found it. By means of the celloidin method he found perfect epithelium. The plan practised by Champney and Barbour of putting the hand into the uterus is misleading, because when the hand is in the uterus, the latter is distended. Dr Barbour does not know how the placenta separates, and he advances a theory for which there is no evidence. Prof. Simpson says he would use the Credé method to separate the placenta; from this Dr Hart dissents. The safest plan is to keep the hand on the uterus till it contracts and is diminished in bulk, and then, if necessary, use the Credé method to expel it.

III. REPORT OF THE ROYAL MATERNITY AND SIMPSON MEMORIAL HOSPITAL, FOR THE QUARTER ENDING 31ST OCTOBER 1887.

By R. HENRY MADDOX, M.B., C.M., M.R.C.S., and G. OWEN C. MACKNESS, B.A. Oxon., M.B., C.M., Resident Physicians.

DURING the quarter there have been 67 intern and 198 extern cases.

INTERN CASES.

Of the 67 women delivered in the Hospital, 39 were primiparæ, and 28 were multiparæ.

The numbers were as follows:—i.-paræ, 39; ii.-paræ, 13; iii.-paræ, 3; iv.-paræ, 2; v.-paræ, 3; vi.-paræ, 3; vii.-paræ, 2; xiii.-para, 1. There was also one woman who asserted that she was a primipara, but who in delivery was found to be an undoubted multipara.

The average age of the primiparæ was 23·125 years, the oldest being 42, the youngest 16. The average age of the multiparæ was 27·715 years, the oldest being 39, the youngest 22.

There were 67 children born—37 being males, 30 females. There was also one abortion (female fœtus), between the 6th and

7th months, in a syphilitic woman. The primiparæ gave birth to 22 males and 18 females. The multiparæ gave birth to 15 males and 12 females. There were 3 cases of premature labour, one at the 8th month, where labour was induced in a woman with a small pelvis; one which came on at the beginning of the 9th month, and one at the 7th month. In the last case the woman had had several dead-born children at the 7th month, after having borne 4 living children at full term, and the placenta showed signs of syphilis.

Average Duration of Labour.—Primiparæ: 1st stage, 14·31 hours; 2nd stage, 1·69 hours; 3rd stage, 13·42 minutes. Longest total labour, 37 hours 10 minutes; shortest total labour, 6 hours 20 minutes.

Average Duration of Labour.—Multiparæ: 1st stage, 9·4 hours; 2nd stage, 47·6 minutes; 3rd stage, 14·7 minutes. Longest total labour, 25 hours 50 minutes; shortest total labour, 2 hours 55 minutes.

The labours are classified as follows:—Natural, 48; laborious, 14; preternatural, 1; complex, 3; abortion, 1.

The vertex presented on 65 occasions as follows:—L.O.A., 43; R.O.P., 20; R.O.A., 2. In one case the occiput remained posterior, but the pelvis being roomy, and the woman a multipara, delivery was effected without any interference; in another case, where forceps were applied, rotation forwards of the occiput did not occur until the head was low down on the perinæum.

Laborious.—Forceps were applied on 16 occasions, 2 high and 14 low; 3 times in multiparæ, and 13 times in primiparæ. Both the high forceps cases were for justo-minor pelves; in one case, the diagonal conjugate at the brim measured $4\frac{1}{4}$ inches; in the other case, where the diagonal conjugate at the brim was $3\frac{3}{4}$ inches, premature labour was induced between the 7th and 8th months. Of the low forceps cases 3 were for delay in the 2nd stage, due to prolapse of the anterior lip of the cervix; 9 for threatening inertia uteri, due on 6 occasions to the large size of the fœtal head, once to early rupture of the membranes, once to rigidity of the os uteri, and once to rigidity of the perinæum. They were also applied twice in complex cases, in one of which there were threatening eclampsia, and in the other multiple cardiac lesions.

Preternatural.—In this case the breech presented R.S.A.; the child was premature at the 7th month, and was putrid; after the body had been delivered, the os uteri closed tightly round the child's neck, and the labour had to be completed under chloroform by traction on the child's body and expression. There was also a shoulder presentation, L.A.A., in the second of twins, which was turned.

Complex.—One was a case of twins occurring in a primipara; the first child presented by the vertex, R.O.P., and was a male; the second child, a female, presented by the shoulder, L.A.A., and

was turned immediately after the birth of the first one. There was a single placenta with one chorion and two amnions; the cord of the second child was velamentous.

Another case was that of a primipara, aged 22, admitted suffering from intense albuminuria, with great œdema of the face and body generally, and effusion into the pleural and pericardial cavities. She also complained of headache and dimness of vision. There was no history of scarlet fever. She was at once put upon milk diet and ordered a purge, and a mixture containing iron, digitalis, and squills. She went into labour the next evening, and about three hours after the commencement of the pains she developed twitchings of the facial muscles, with spasmodic startings of the limbs, while the eyeballs were rolled continuously from side to side; at the same time she became semi-comatose. She was at once packed in blankets, with hot bottles round her; no pilocarpin was used on account of the œdema of the lungs; chloroform was administered during the pains; syrup of chloral was also given at intervals. The convulsions passed off, and she became quite conscious; the os dilated very slowly, although the pains were strong and regular. As soon as the os was fully dilated forceps were applied and the child delivered. There was no recurrence of the convulsions. During the puerperium the amount of urine increased under treatment with iron, digitalis, and bitartrate of potash, while the œdema and effusions quite disappeared. The albumen in the urine diminished considerably, but did not entirely disappear, although at the end of ten days tube casts, which were present at first, could not be found. Ophthalmoscopic examination of the eyes showed the fundus to be quite normal.

The third case was one complicated with multiple cardiac lesions, and is described in detail by Dr Croom at a previous meeting of the Society.

Abortion.—This occurred in a syphilitic woman between the 6th and 7th months.

Mortality.—Maternal, none; fœtal, 6; infantile, 2.

Of the *fœtal deaths*, 1 occurred in a case of high forceps for small pelvis; 2 were dead and putrid in utero in women suffering from syphilis; 1 was dead in utero in a woman suffering from melancholia; 1 occurred where low forceps were applied in an occipito-posterior case, where rotation forwards of the occiput did not occur until the head was low down on the perinæum, and where the anterior lip of the cervix and the posterior vaginal wall prolapsed; another occurred where the labour was delayed, and the cord tightly round the child's neck.

Of the *infantile deaths*, 1 was a premature child, where labour had been induced, and where, although the child was kept in an incubator, it died of debility on the 4th day; the other was a child which died of convulsions six weeks after delivery.

Average Weight of Children.—Primiparæ: male, 7 lbs. 0·45 oz.; heaviest, 9 lbs. 10 oz.; female, 6 lbs. 8·4 oz.; heaviest, 8 lbs. 4 oz. Multiparæ: male, 7 lbs. 15·57 oz.; heaviest, 9 lbs. 8 oz.; female, 7 lbs. 4·91 oz.; heaviest, 8 lbs. 14 oz.

Average Length of the Umbilical Cord.—Males, 23·98 inches; females, 22·56 inches: longest, 34½ inches; shortest, 14 inches.

One case was admitted suffering from melancholia of pregnancy. She was a woman aged 26, who had had twins once and no other children. Her mother was in a lunatic asylum. Three months before admission the condition suddenly developed. She once attempted to poison herself. Her husband stated that he thought the child was alive three weeks before delivery. She was delivered of a dead child, but her condition did not improve while she was in the Hospital, so she was sent on the 14th day to Morningside Asylum.

Rupture of the Perinæum occurred in several cases to a slight extent; all healed by first intention, after being stitched with catgut stitches, except two, one of which was in a woman suffering from severe secondary syphilis.

Ergotin was administered hypodermically in every case, except that of the woman suffering from cardiac complications, directly after the 3rd stage was ended, and in no case was there any post-partum hæmorrhage.

Puerperium.—In most of the cases the temperature never rose above 100° F.; the high temperatures were in nearly all cases due to mammary or alimentary disturbances. There was one case of parametritis, probably septic, which is described more fully below. Sore nipples were extremely prevalent during the quarter, and gave considerable trouble, owing to the inflammation of the breasts which frequently accompanied them. After trying various remedies, the best results of treatment were obtained by washing the nipples with boric lotion, and then painting them with Tr. Benzoini Co. In one case a double mammary abscess developed after sore nipples; the abscesses were opened and drained with strict antiseptic precautions, and healed without giving any further trouble. There were several scarlatiniform rashes noticed, but of these a separate account has been given in another part of this Journal.

Strict antiseptics were used in every case; corrosive sublimate solution (1 in 5000) being used as a vaginal douche twice daily, except in the albuminuria case, where carbolic acid solution (1 in 40) was used.

The following cases call for special remark:—

Case I.—Mrs M'L., aged 35, v.-para, admitted 1st August 1887. Her first labour in 1879 was a very long one, and the child's head had to be perforated; second labour in 1881, when perforation was also performed; third in 1882, when Professor Simpson performed basilysis; fourth in 1884, when Professor Simpson induced

premature labour at the 8th month, the child being alive and healthy now. She last menstruated from 16th December to 19th December 1886; stirrage first felt early in April 1887. On admission the fundus was 2 inches below the ensiform cartilage; length of uterus, 12½ inches. Cavity of vagina small; concavity of sacrum much exaggerated; cervix high up and looking back. Pelvic measurements—inter-cristal diameter, 10 inches; inter-spinous, 8½ inches; inter-trochanteric, 12 inches; external conjugate, 7¼ inches; diagonal conjugate, 3¾ inches.

On 3rd August a hot douche was given every two hours. On 4th August, at 11.45 A.M., Dr Hart introduced a large metal bougie into the uterus, separating the membranes for 4 inches on one side. This was then removed and a gum-elastic bougie passed in and tied in position. A large Barnes' bag was introduced into the vagina, being removed every two hours in order to give a hot vaginal douche. At 3.30 P.M. the bougie slipped out and was not replaced. At 5.30 P.M. the metal bougie was introduced again and tied in position. At 9.45 P.M. the bougie was found to have slipped out and was not replaced. The os admitted three fingers. There were slight pains in the back. On 5th August, at 10.45 A.M., Dr Hart passed a small Barnes' bag into the cervix, and at the same time a large one was placed in the vagina. At 1.30 P.M. the Barnes' bag in the cervix slipped out and was not replaced. The pains were more regular and stronger. At 9.30 P.M. chloroform was administered, and Dr Hart further dilated the cervix with Barnes' bags. At 10.10 P.M. the os was fully dilated and the membranes ruptured. At 10.25 P.M. high forceps were applied, and the head pulled on to the perineum with some difficulty. The forceps were then removed and the child expressed at 10.45 P.M. The child breathed well and cried at once. Its head was considerably bruised. It was placed in cotton-wool in an incubator at a temperature of 75° F. The dimensions of the head were as follows: O.M. diameter, 5⅜ in.; O.F., 5 in.; S.O.B., 3½ in.; Bi-P., 3½ in.; Bi-T., 2¾ in. Length of child, 18 in.; weight, 5 lbs. 4 oz. On 6th August, morning temperature, 99° F.; pulse, 84. Evening temperature, 99°·4 F.; pulse, 108. On 7th August she was feeling well; lochial discharge moderate and sweet; temperature, 102°·8 F., and pulse, 112 in the morning. Per vaginam no local pain or tenderness. Uterus was douched out twice. The baby was being fed on peptonized milk and kept in the incubator. At mid-day, on 8th August, the temperature was 103°·8 F. and pulse 120. Ten grs. of antifebrin were given, and brought down the temperature nearly two degrees in two hours. On 9th August the child died suddenly, apparently of weakness. The patient's temperature continued to rise to nearly 103° F. every evening, while it was almost normal in the morning. The pulse varied between 98 and 120. There was no pain on palpation over the abdomen nor per vaginam, but the anterior lip of the cervix was much swollen and

bruised. The uterine douche was repeated night and morning until 13th August, when the temperature had sunk to normal and remained there, while the pulse was about 78. From this time she made an uninterrupted recovery, and was dismissed on 26th August.

Case II.—E. S., i.-para, age 30. Admitted 4th August; confined on 5th August 1887; presentation vertex; position L.O.A. After the birth of the head, the right hand came down with the shoulders and tore the perinæum, requiring three catgut stitches. She passed her urine on the first day. On the third day ʒj. of Henry's solution was given without producing any motion; but on the fourth day the bowels moved freely after ʒss. of castor oil. In the evening the temperature was found to be 104°·6 F. and the pulse 132. Next morning it fell to 102°·2 F., but rose again in the evening to 103°·4 F., the pulse remaining over 120. She was ordered 1 minim of tr. aconiti every quarter of an hour. After five doses the temperature had fallen considerably, but the heart was so weak that the aconite was discontinued, and one granule of digitaline thrice daily substituted. The uterus was also douched on this and the following day; the discharge was scanty but quite sweet. On 10th August the temperature was over 104° F., and 10 grains of sulphate of quinine were given, causing a fall of nearly three degrees. On 11th August, when the temperature was 104°·2 F., 10 grains of antifebrin were administered, causing a fall of four degrees in five hours, and no rise occurred until nine hours after the drug was given. On examining per vaginam, a large deposit was found in the left lateral fornix, with considerable tenderness over the left iliac fossa. A large blister was applied over this region, and frequent hot douches ordered. She was ordered ʒss. of brandy every three hours, 1 granule of digitaline thrice daily, and 15 minims of tr. ferri muriat. every four hours. An evening rise of temperature to about 103° F. persisted, while it fell to about 100° F. in the morning. Whenever it rose above 103° F. 10 grains of antifebrin were given, and invariably caused a fall, which persisted for some time. The pulse remained over 100 and was very weak. As she had no milk, the baby was put on the bottle on 14th August. On 15th August, at 9 A.M., the temperature was 104° F.; 20 grains of salicylate of soda were given; the temperature continued to rise, and at 5 P.M. it was 105° F.; the salicylate of soda was repeated, but at 7 P.M. it was still 105° F.; ten grains of antifebrin were then given, and at 12 P.M. it was 100°·6 F. She was ordered 10 grains of benzoate of soda thrice daily. This was continued for a week. Her condition remained much the same until 26th August, when she developed severe vomiting and diarrhœa, which lasted for three days, while the temperature remained at about 102° F. morning and evening; this was treated with hot fomentations and opium. On 31st August the temperature became normal, and remained nearly so, although it still showed a slight

evening rise. On 10th September menstruation returned, and lasted for four days. On 19th September the baby, which had suffered from severe diarrhœa for some time and had gradually got weaker, although all sorts of nourishment had been tried, died of convulsions. On 22nd September she was sent into Dr Croom's Ward, Royal Infirmary, where she remained about a fortnight, and was then dismissed cured.

Extern Cases.

There were 198 patients attended at their own homes. Of these 39 were primiparæ, 159 multiparæ.

There were 195 children born (5 cases of twins). Of these, 106 were males and 89 females.

Labours are classified as follows:—Natural, 161; laborious, 14; preternatural, 7; complex, 9; abortions, 7. Of the above, 8 were premature.

Of the vertex presentations, the positions were: L.O.A., 166; R.O.P., 8; R.O.A., 4; L.O.P., 1. In 6 cases the position was not ascertained.

Of the *laborious labours*, 1 was a case of tedious labour, owing to the right hand coming down in front of the head. Low forceps were applied in 8 cases for inertia uteri with exhaustion; in 2 cases for impaction of the anterior lip of the cervix; in 1 case for hæmorrhage during the second stage; and in 1 case for non-rotation forwards of the occiput in an occipito-posterior case. High forceps were applied in 1 case for justo-minor pelvis complicated with mitral stenosis and prolapsus funis.

Of the *preternatural labours*, 1 was a knee L.S.A.; 5 were breech L.S.A.; 1, R.S.A.; and 1, L.S.P.

Of the *complex labours*, 5 were cases of twins, which presented as follows: (1) and (2), both vertex L.O.A.; (3), vertex L.O.A. and vertex R.O.A.; (4), vertex, position not ascertained, and breech R.S.A.; (5), breech and vertex, positions not ascertained. One a case of accidental hæmorrhage at the seventh month in a breech case; 1 a case of eclampsia, described below; 1 a case of post-partum hæmorrhage; 1 a case of adherent placenta, with hæmorrhage, where the placenta was removed 2½ hours after the birth of the child, the os having contracted considerably.

Of the *premature labours*, 1 was at eight and a half months; 1 at the eighth month; 5 at the seventh month; and 1 at six and a half months. One of these was a case of twins at the seventh month; in 2 cases low forceps were applied for inertia uteri; in 2 cases the breech presented.

Of the *abortions*, 4 were at the fourth month; 1 at three and a half months; 1 at the fourth week; and 1 was not ascertained.

Mortality.—Maternal, 3; fœtal, 21; infantile, 2.

Of the *maternal deaths*, 1 occurred in the case of eclampsia

detailed below; 1 was from acute pneumonia on the third day after delivery; and 1 in a case of abortion complicated with mitral stenosis, which has already been reported by Dr Hart.

Of the *fœtal deaths*, 7 were the abortions above mentioned; 3 were syphilitic, 1 of these being at the sixth month, 1 at the seventh month, and 1 at full term; 3 were in breech cases at full term; in 4 cases the placenta was fatty, and in 1 of these it was much hypertrophied, weighing 3 lbs. 7 oz., while there was also hydramnios causing labour to come on at the eighth month; 1 occurred in case of justo-minor pelvis complicated with mitral stenosis and prolapsus funis; 1 was premature at the seventh month; 1 was a second twin and premature; 1 occurred during a normal labour.

Of the *infantile deaths*, 1 was a child born by the breech, which died almost immediately; the other was a premature twin, which died a few hours after birth.

The following case calls for special remark:—M. B., i.-para, age 18, confined on 27th August 1887. She was quite well until a week before delivery, when she complained of difficulty and pain on micturition, with pain in the lumbar regions posteriorly. Later she suffered from frontal headache, but no dimness of vision or œdema were present. She had had considerable mental worry. The labour progressed normally until 6.10 A.M., when she had a convulsion. At 6.20 A.M. she was extremely restless but conscious. The child was born alive soon after. About ʒij. of urine were drawn off, and contained a mere trace of albumen. Later she became more restless, requiring force to keep her in bed, and was apparently in a hysterical condition. After delivery she had two convulsions, and then no more until 2 P.M., when she had three more, and then several during the afternoon. Digitalis and iron were given in the morning and milk diet ordered; chloral was also administered. At 7 P.M. Dr Hart saw her, and ordered chloral and bromide; the condition was thought to be hysterical. During the night she had a succession of fits, which were more eclamptic in character, and recurred fairly regularly every half-hour. On 28th August some urine was drawn off and found to be loaded with albumen. She had already passed a large quantity of urine in the bed unconsciously; there had been very little discharge from the uterus; no œdema was present. At 1.45 P.M. she was packed in blankets with hot-water bottles, and gr. ⅓ of pilocarpin administered hypodermically. Sweating became profuse, but the pulse failed, and death occurred at 2.10 P.M. She had been completely unconscious for about nine hours before death. On post-mortem examination the kidneys showed some contraction of the cortex, while the capsule was adherent in places and the pyramids apparently fatty. The membranes of the brain were also considerably congested.

MEETING V.—FEBRUARY 8, 1888.

Dr UNDERHILL, *President, afterwards* Professor SIMPSON, *in the Chair.*

I. *Professor Simpson* showed a PLACENTA with omphalo-mesenteric vessels and umbilical vesicle. The child was born at full time.

II. *Dr Foulis* exhibited two sets of PELLETS composed of perchloride of mercury and tartaric acid, which, when dissolved in a pint of water, give perchloride solutions of 1 in 1500 and 3000 respectively.

III. THE CAUSE OF THE HEAD DOWNWARD PRESENTATION, AND OF THE FIRST CRANIAL POSITION.

By JAMES FOULIS, M.D., F.R.C.P. Ed.

MR PRESIDENT AND GENTLEMEN,—Leading obstetricians are agreed that, in child-births occurring in all parts of the world, among all races of human beings, head presentations take place in about 95 per cent. of the cases, and that of these head presentations the first or left occipito-anterior position of the child's head, after it has entered the pelvic brim, occurs in about 75 per cent. of the cases.

When anything naturally occurs 95 times out of 100, as is the case with head presentations, or when anything naturally occurs 75 times out of 100, as is the case with the first cranial position, we may fairly conclude that there is in each case a discoverable cause or law in operation which brings about such results. Let us try to find out what is the true cause in each case.

The three chief theories before the world at present as to the causation of head downward presentations are those of Dubois, Sir James Simpson, and Dr Matthews Duncan.

Dubois's theory is that the head downward position is the result of "an instinctive impulse which inclines the fœtus to take the most favourable position for its escape" (Dr Ramsbotham, *Obstetric Medicine and Surgery*, p. 309). That the movements by which the fœtus comes to lie head downwards in the uterus are "volitional."

In his paper "On the Attitude and Positions of the Fœtus in Utero," read before the Medico-Chirurgical Society of Edinburgh in December 1848, the late Sir James Simpson, while disproving Dubois's theory, tried to show that the natural position of the fœtus in utero is brought about by reflex movements on the part of the fœtus, excited by cutaneous irritation, which result in the fœtus adapting itself to the obovoid shape of the uterus, so that

it comes to lie in the most comfortable position, and as free as possible from cutaneous irritations.

Dr Matthews Duncan, in opposition to this view, maintains that the head downward position of the child in utero, in the later weeks of pregnancy, is simply the result of gravitation.

I shall have to quote very fully from the writings of these last two authors, so that we may bring clearly before us the arguments which they use in support of their theories.

In the first place, let us see what Sir James Simpson says about the natural position of the fœtus in utero during the last few weeks of pregnancy,—

"At, and for some time before, the full period of utero-gestation, the mode in which the child is situated in utero is generally as follows:[1] The trunk and spine are usually slightly curved, and the head is bent forwards, with the chin approaching towards the sternum. The thighs are drawn upwards, and flexed upon the abdomen; and the legs are flexed and laid along the posterior surfaces of the thighs. The feet, which are sometimes crossed, are thus placed near the nates, and in front of them. In the interspace between the knees and face the upper extremities are situated, the arms being laid across the sides of the thorax, and the forearms flexed and crossed in front of the chest.[2] The whole fœtus is thus flexed and rolled up in an ovoid mass, of such a form as to occupy the least possible space. One end of the ovoid is formed by the head, the other by the breech of the child.

"Various opinions and modifications of opinions have been suggested in order to explain why the head of the infant is thus, before birth, usually placed lowest and over the os uteri, and why some special circumstances should occasionally change this law and produce malpresentations. Whatever explanation may be given of the position of the infant in utero, one fact has been sufficiently established in regard to it by modern investigations, namely, that the position with the head lowest is not assumed till the later months of utero-gestation. Before the beginning of the sixth or seventh month the ovoid mass of the fœtus lies in utero, in nearly an equal number of cases, with its cephalic and its pelvic extremities lowest, or over the os uteri; and in a considerable proportion of instances it is still placed across or transversely, so that the trunk is opposite the os uteri. Hence, in abortions, presentations of the feet or pelvis are nearly as frequent as presentations of the head; and presentations of the arm are by no means uncommon. In the Maternity Hospital of Paris, Professor Paul Dubois found that out of 121 fœtuses, born alive or dead before the end of the sixth month, 65 presented by the head, 51 by the pelvis, and 5 were cross-births or presented by the arm or shoulder. Further, the position of the head towards the os uteri appears to be

"[1] Through the kindness of Professor Goodsir, I am enabled to give, in Fig. 1, a sketch of the attitude of the fœtus in a subject brought into the dissecting-rooms during the present winter. She had died of cholera, near the full time of utero-gestation. The placenta is seen situated on the right side of the uterus, opposite the right foot of the infant. In injecting the vessels, some wax escaped in the interspace between the two feet, and probably slightly altered their position.

"[2] 'The most common situation of the extremities is not to be determined, as they are found to be a little different in different dissections; and in the living body they vary almost every moment: thence the hands are seen indiscriminately on the head or face, or across one another, or around the knees or legs, or the legs are sometimes extended, and the feet are placed by the face, or one in that position, and the other contracted and the foot downwards.'—Dr William Hunter's *Anatomical Description of the Gravid Uterus*, p. 62.

taken up more and more frequently and certainly from the end of the sixth month onwards. Out of 73 instances in which the child was born prematurely but alive during the currency of the seventh month, Dubois found it presenting by the head in 61 cases, by the pelvis in 10 cases, and by the shoulder in 2 cases. Hence, while before the end of the sixth month the proportion of head presentations amounted to 55 in the 100, during the course of the next month they were found already amounting to 82 in the 100; at the full time they amount, as we have previously stated, to 96 or 97 in the 100."

In speaking of the theory of gravitation being the cause of the head downward position of the fœtus, Sir James says:—

"The head is, proportionably to the body, far larger and heavier in the fœtus than in the adult. Most authorities have supposed that the position of the fœtus in utero with the head undermost was owing to the greater specific gravity of the head determining this part, *in the erect position* of the mother's body, to fall to the lowest part of the uterine cavity, or toward the os uteri."

He then proceeds to show that in women who have been confined to the horizontal position in bed during the whole time of utero-gestation, and who have never assumed the vertical position, the child still presents head downwards. Sir James uses this fact against the gravitation theory; but Matthews Duncan has clearly shown that the axis of the pregnant uterus, both in the *vertical* position and in the *dorsal* position of the mother, is such that the child may easily gravitate head downwards in both cases, and that the pregnant uterus is only horizontal when the mother is lying on her side.

Sir James again says:—

"If the physical gravitation of the head of the child were the cause of the normal position with the head lowest, then this position ought to be found with more frequency and certainty when the gravitation of the head from any cause was rendered proportionally greater than natural; with less frequency and certainty when, from other causes, the gravitation of the cephalic extremity of the infant was rendered proportionately less than natural. The very contrary, however, of all this is the truth. In cases of intrauterine hydrocephalus, the child's head is larger and heavier than usual, and sometimes it is so to an excessive degree. But this condition of the head, this increased preponderance and gravitation of it, does not render head presentations in these cases more common than usual, but the very reverse. In an excellent thesis on hydrocephalus of the fœtus as a cause of rupture of the uterus, my young friend, Dr Thomas Keith, last year collected the histories of 69 cases of intrauterine hydrocephalus at birth. Of these 69 hydrocephalic fœtuses, 11 presented preternaturally, or 1 in 6. When the head and fœtus is normal, preternatural presentations occur, in proportion to other presentations, as 1 to 26. Hence, preternatural presentation was four times more frequent in hydrocephalic than in natural cases, while it ought to be more frequent in the former than in the latter if the doctrine of gravitation were true. Again, anencephalic fœtuses, with the whole brain and arch of the cranium wanting, are still often found presenting naturally. I have been present at the birth of three anencephali that had reached the full term of pregnancy. All of the three presented with the deformed and diminished cephalic extremity over the os uteri."

With reference to this argument of the hydrocephalic fœtuses, Dr Matthews Duncan thus says:—

"Now this argument, when justly applied, is made to tell most decidedly in favour of the gravitation theory. The altered circumstances of a hydrocephalic fœtus have been altogether misapprehended. The hydrocephalic head, although truly much larger and heavier in air, is probably lighter and more buoyant in water. In this question we have to do with hydrocephalic children only while immersed in liquor amnii. The larger the head is in these circumstances, the lighter and more buoyant it is, and the other extremity of the child is proportionally heavier. The fluid effused in hydrocephalus is specifically lighter than brain, and therefore renders the head more buoyant than it is under natural circumstances. It is also in all probability specifically lighter than liquor amnii, and consequently its accumulation will have a more decided effect in elevating the head. In this way it is demonstrated that the four times greater frequency of preternatural presentations in cases of hydrocephalic children proves rather than disproves the influence of gravitation in deciding the position of the fœtus."

With regard to the anencephalic fœtuses Matthews Duncan quotes from Dr William Hunter to the effect, that even without the head altogether, the upper part of the body of the fœtus is heavier than the lower part, and that therefore the small-headed fœtuses are still subject to the law of gravitation in the same way as the more heavily headed ones are. And with regard to Sir James Simpson's statement about the common occurrence of malpresentations in the later months of pregnancy in the case of *dead* children, Matthews Duncan adduces a number of experiments made by himself to show that after the fœtus is dead in utero, "death and putridity produce great and rapid changes *quoad* gravity."

As the result of these experiments he concludes that—

"The healthy fœtus floats obliquely with its head lowest in a fluid of its own specific gravity, a position corresponding to that which it has in utero.

"Soon after the death of the fœtus in utero changes take place in it which alter its position of equilibrium in a fluid of its own specific gravity, so as to be generally the reverse of that of the healthy fœtus,—that is, so as to be oblique with its head highest."

"It may happen that an advanced stage of decomposition of the fœtus, with collapse of the cranium, may make its position of equilibrium, when floating, again oblique, with the head lowest."

Dr Matthews Duncan thus states his conclusions as to the theory that gravitation is the cause of the head downward position of the fœtus in utero:—

"The position of the fœtus at the full time is, in the great mass of cases, fixed and determined about the end of the seventh month of pregnancy. This arises from the fact that about that time the size and shape of the uterus become so nearly and closely adapted to the size and form of the fœtus, that it cannot change the position of its trunk in any material degree. After this time the position of the fœtus must be one determined by gravitation, for it is impossible to conceive its reposing in any other.

"All the knowledge we possess of the position of the fœtus, after it has entered the second half of pregnancy, leads us to believe that its head lies ordinarily lowest. Before the seventh month it is still capable of having its position in utero changed, by changes merely in the attitude of the mother, and probably it possesses the power of effecting temporary changes, at least,

by its own unaided movements. But the fœtus is generally in a state of repose, and not producing motions in its limbs or body. In this state of repose, in a fluid of nearly its own specific gravity, it is impossible to conceive of its maintaining any position but under the influence of gravity. Its position must at all times be mainly, if not entirely, caused and determined by statical circumstances. It is quite conceivable, that while still comparatively free in the uterus, it may, by virtue of its very easy mobility in the dense liquor amnii, change its position. If this occur at a time when its dimensions are beginning to approximate to those of the uterus, having overcome some resistance of the uterine walls by the force of its own muscular efforts, or otherwise —as by accidents to the mother—it may not gravitate back to its old and ordinary position; and thus a preternatural presentation may be produced. The uterine walls are everywhere smooth and glabrous, and rounded; and the fœtus lies in this cavity with its legs, its chief organs of locomotion, elevated,—circumstances which appear to render its maintenance of any position but that of gravitation a greater feat than ever was performed by a rope-dancer. With all the advantages of its new circumstances, the child after birth cannot assume or maintain any position. How much less could it be expected to do so in the uterus, and under circumstances so disadvantageous for the fulfilment of such a function. Those authors who, with Dubois, strive to prove that the position of the fœtus is determined by its own motions, have first to prove that it could maintain any position whatever against gravity, without such constant efforts as voluntary muscles are incapable of, and of the actual presence of which no evidence can be furnished.

"Did the fœtus in utero maintain any position other than that of gravitation, it must be making incessant efforts to do so. A moment's rest will insure its falling into a position given it by gravitation. It does not exert incessant activity,—therefore its maintenance of any position different from one produced by gravitation is impossible.

"At all times, and under all circumstances, the fœtus must assume a position of gravitation as soon as it ceases to make efforts, whether voluntary, instinctive, or reflex.

"'The reason,' says W. Hunter, 'why the child's head is commonly downwards may be supposed to be this: the child is specifically heavier than the liquor amnii, and therefore, in the various attitudes of the mother, is always in contact with and supported upon the depending part of the uterus. This in the more common attitudes is the cervix uteri. The child's head and upper part of the trunk contain more matter in proportion to their surface than the lower part of the body; thence the head will more generally fall down to the lower part of the uterus. And for the same reason, were a child to be dropped into deep water, in various postures and directions, its head would always first reach the bottom. But the motion of the head itself, either alone or in co-operation with the attitude of the mother, may sometimes turn the head towards the fundus uteri.'"

It is now necessary that I should refer very fully to Sir James Simpson's remarks on "The Mode of Maintenance of the Position of the Fœtus towards the end of Pregnancy." I shall quote his exact words, because by the time we have read what he has said on this subject we shall have learnt that his theory teaches that the position of the fœtus in utero in the later months of pregnancy is regulated *by the shape of the uterus*, and that what he calls the *natural position* of the fœtus in utero is caused by the fœtus struggling, as the result of excito-motory or reflex movements, to adapt itself to the shape of the uterus; and when once it is in that position, it lies most comfortably and most free from all

sources of cutaneous irritations which might excite disturbing muscular movements.

"*Mode of Maintenance of the Position of the Fœtus towards the end of Pregnancy.*

"At, and, as we have already seen, for some time before parturition, the human fœtus is rolled up into an ovoid-formed mass, with its cephalic extremity placed lowest, or over the os uteri. When thus placed, it stands, so to speak, upon its head, when the mother is in the erect posture. To comprehend the mode in which this peculiar position is maintained during the latter period of utero-gestation, it is necessary to attend to the relative shapes or forms of the uterus and of the fœtus at that period. For it is the relation in shape of the fœtus to the uterus—of the contained to the containing body—that regulates this position. And the maintenance and restoration of the position is effected by reflex movements, when its continuance is from time to time threatened to be interrupted by movements of the mother's body, or by other circumstances affecting the conditions and relations of either the uterus or infant.

"The form of the uterus at the full term of utero-gestation is ovoid. See the outline of it from Hunter's most accurate drawing in Figure 3. 'The general figure of the uterus at this time is,' says Dr Hunter,[1] 'oviform; the fundus answering to the largest extremity of the egg, and the cervix and os uteri to the small end; but the fundus is larger and more flat, or less pointed, in proportion to the lower extremity of the uterus, than one end of an egg is to the other. And the whole uterus seems more or less compressed, so as to be broader from right to left than it is from the fore backwards.'

"Towards the end of pregnancy the fœtus is situated in the uterus in such a way that the figure of the contained body (the fœtus) thus comes to correspond with the figure of the containing body (the cavity of the uterus), and is, as it were, fitted into it. Figure 2 represents the one ovoid (Fig. 4) thus adapted to the other ovoid (Fig. 3).

"At the advanced time of pregnancy of which we are speaking, when the uterus and fœtus are normal in shape and size, the fœtus cannot be placed transversely in the uterine cavity, so as to form a transverse or arm presentation, as there is not room for it to lie in that position. For the long axis of the ovoid mass is about 12 inches; the greatest breadth of the uterus is only 8 inches; so that the latter could not receive the former. For the same reason, when once the position with the head downwards is assumed, it comes to be difficult or impossible for the child near the full time to move round in utero, so as to turn its pelvic, instead of its cephalic extremity downwards, and towards the os. In fact, a compressible body of 12 inches in length, such as the rolled up fœtus is, cannot readily move through a space of only 8 or 9 inches, even though that space, like the transverse axis of the uterine cavity, be capable of dilatation and forcible alteration of shape.

"At and towards the full term of utero-gestation, the position of the fœtus with the head lowest is thus greatly maintained by the relative *physical* adaptation of the ovoid shape of the rolled up mass of the fœtus to the ovoid shape of the interior of the cavity of the uterus. But this particular adaptation and position of the fœtus in the uterine cavity would be often lost if no other additional and *vital* means were in operation—as we see indeed often happen when the child dies. The other additional vital means, by whose influence this special position is still further rigorously and carefully sustained, consists of the restoring influence of reflex motions on the part of the fœtus itself. For, let the relative adaptation and position of the fœtus be partially disturbed (as readily happens by any movements of the mother, as, for example, by her suddenly assuming the upright or supine postures, or other such causes), and immediately the fœtus, by a series of reflex movements of

[1] *Anatomical Description of the Human Gravid Uterus*, p. 3.

its extremities, particularly of its lower extremities, acts till it regains its former perfect position. It moves, in other words, till it has retaken that position in which it is most free from any marked excitations or compressions upon the external surface of its own body."

The following are the conclusions at the end of Professor Sir James Simpson's paper :—

"1. The usual position of the fœtus, with the head lowest, and presenting over the os uteri, is not assumed till about the sixth month of intrauterine life, and becomes more frequent and more certain from that time onwards to the full term of utero-gestation.

"2. Both the assumption and maintenance of this position are vital and not physical acts, for they are found to be dependent on the existence and continuance of vitality in the child—concurring with its life, but being lost by its death.

"3. In human physiology, we do not know or recognise any vital power or action, except muscular action, capable of producing motions calculated to alter or regulate the position, either of the whole body, or of any of its parts ; and further, the motory muscular actions of the fœtus are not spontaneous or voluntary, but reflex or excito-motory in their nature, causation, and effects.

"4. The position of the fœtus, with the head placed over the os uteri, is that position in which the physical shape of the normal and fully developed fœtus is best adapted to the physical shape of the normal and fully developed cavity of the uterus.

"5. This adaptive position of the contained body to the containing cavity is the aggregate result of reflex or excito-motory movements on the part of the fœtus, by which it keeps its cutaneous surface withdrawn as far as possible from the causes of irritation that may act upon it as excitants, or that happen to restrain its freedom of position or motion."

Later on, in speaking of the irregular shape of the uterus as a means of causing malpresentations, he refers to Fig. 6 in the following words :—

"In Figure 6 I have copied from Chailly the figure which he gives of the shape of the uterus under a pelvic presentation. An uterus of such a configuration (with the ovoid reversed—the largest extremity lowest) would, according to the principles laid down in the text, lead to the pelvic instead of the cephalic position of the fœtus."

And in speaking of the frequency of malpresentations in multiparous pregnancies he says :—

"The cavities which contain fœtuses in multiparous pregnancy are more or less relatively different in shape from the cavity which contains the fœtus in uniparous pregnancy. As the reflex irritations and movements of the fœtus force it to adapt itself to the form of the cavity containing it, malpositions and malpresentations among those children are more common than among single births."

Now, I think we have very clearly before us the essence of Sir James Simpson's theory, which is, that in the later months of pregnancy the shape of the uterus—the containing body—regulates the position of the fœtus—the contained body.

Hear what Matthews Duncan says with regard to this theory :—

"Now, this is a very grave error in reasoning, probably also in physiology.

"The error in reasoning consists in assuming as an essential part of the argument that the uterus takes an ovoid shape independently of its contents.

"The probable error in physiology is the assumption that the uterus assumes a shape independently of the ovum or the fœtus. It appears to me the very reverse is nearer the truth.

"The weight of authority is in favour of the opinion, that the ovum or fœtus gives laws of shape to the uterus, and not *vice versa*, as Sir James Simpson assumes.

"The uterus has no difficulty in adapting itself to great distension, to the shape of twin ova, to the shape of deformed women, or to the shape of a collection of fibrous tumours.

"William Hunter, in his anatomical description of the human gravid uterus, describes the plastic state of the uterus as making it adapt its figure to the circumstances of the child within, and vary as these change. He says its figure differs from the regular oviform from a variety of accidental causes, as it adapts itself to the neighbouring parts, to the attitude of the body, and to the position of the contained child. 'We not only,' says he, 'in dead bodies see the parts of the child making a variety of different projections on the outside of the uterus, but in the living body all the same variety is frequently manifest to the touch, on examining the outside of the abdomen.' Dr Read, in his work on Placenta Prævia (p. 97), makes the following statement regarding the form of the uterus: 'In normal presentations, at the period of its utmost development, the general outline of the uterus is pyriform, the base being above, and the apex resting in the cavity of the pelvis. When the breech presents, it becomes almost globular; and in transverse presentations, the long diameter is nearly at right angles to the axis of the pelvis,—proving very conclusively, that the shape of the uterus at the termination of gestation is not the result of development, but depends upon the position of the contained fœtus. Lastly, I quote briefly from Joulin who, in his *Traité Complet d'Accouchements* (p. 1006), says, 'The uterus in pregnancy is a membranous and pliant sac, which has no other form than that which is impressed upon it by the situation of the infant.'"

I have given these copious extracts from the papers of Sir James Simpson and Dr Matthews Duncan, because I wish to bring clearly before the Society, and to place side by side the arguments used by them in support of their respective theories as to the cause of head downward presentation of the child.

Sir James Simpson's theory is that the uterus in the later months of pregnancy assumes a certain form, and that the fœtus by muscular movements, excited in a reflex manner by cutaneous irritations, adapts itself to the shape of the uterus, so that it may lie in the most comfortable position, and as free as possible from cutaneous irritation. As often as the uterus assumes an obovoid form, the fœtus is forced to lie head downwards, because its breech end fits most comfortably into the upper part of the uterine sac, or the obovoid end of it.

Sir James Simpson also goes further, and endeavours to show that when the uterus assumes an abnormal form, that is, for example, a form in which the larger end of the uterine sac is below, then the child is forced to lie in the uterine cavity with its breech end lowest. Thus Sir James Simpson makes the child's position in utero depend on the shape of the uterus, or, in other words, that it is the shape of the uterus that determines the

position of the child in the later months of pregnancy. According to his theory, if the shape of the uterus is natural, that is obovoid, then the presentation will be natural or head downwards; and if the shape of the uterus is unnatural or abnormal, then the presentation will be a breech or transverse, or other abnormal presentation, according to the shape of the uterine sac.

In opposition to all this, Matthews Duncan argues that Sir James Simpson has committed a great error in assuming that the uterine sac grows into a certain form independently of the form of the contained fœtus. He would have it that the form of the uterine sac in the later months of pregnancy is determined by the shape of the fœtus, and that the form of the uterine sac has little or nothing to do with the causation of the presentation, normal or abnormal, of the fœtus.

The essence of Dr Matthews Duncan's theory in opposition to Sir James Simpson's is, that gravitation alone determines the head downward position of the fœtus in utero. "Did the fœtus in utero maintain any position other than that of gravitation, it must be making incessant efforts to do so." "A moment's rest will insure its falling into a position given it by gravitation." "It does not exert incessant activity, therefore its maintenance of any position different from one produced by gravitation is impossible." "At all times, and under all circumstances, it must assume a position of gravitation as soon as it ceases to make efforts, whether voluntary, instinctive, or reflex."

Now, it is quite certain that up to the fifth or sixth month of pregnancy the uterus is spheroidal in form, not ovoid. (See Fig. 5.)

Sir James Simpson thus remarks, "All anatomical authorities allow that the uterine cavity before the sixth month is spheroidal and not ovoid." "Further, at the same period the uterine cavity is not only roundish in form, but is relatively much larger in regard to the fœtus, for it contains a much larger quantity of liquor amnii. After the sixth month these various conditions are gradually altered."

At this period of gestation, that is, the fifth or six month, the fœtus having abundance of room in the uterine sac, and having now a certain amount of muscular power, especially in the lower limbs, can alter its position in utero, and the changes of position of the mother will also alter the child's position in utero. If the head end of the fœtus is the heavier, this end will at once fall to the bottom of the uterine sac directly muscular movements on the part of the fœtus cease.

In the last two or three months of gestation, Dr Hunter observes, "the child is commonly so much straitened for room, and so compactly adapted to the oblong figure of the uterus, that it cannot change its general position, either by its own efforts, or even by accidents happening to the mother."

From this description, it is quite clear that there comes a

period of utero-gestation when the child, instead of being quite free to move about in the liquor amnii, gradually comes to fit the uterine sac so closely that it cannot easily move about.

This of course means that its body is now in close contact with the inner surface of the uterus, and must in some places press against it. Up to the sixth month the uterine sac is spheroidal, and the fœtus is free to move in it, therefore its body cannot, except temporarily, affect the uterine wall, and cannot give shape to the uterine sac, but in the last two or three months of pregnancy this state of matters is altered. We find that the uterus is now more or less oblong or obovoid, and that the fœtus fits so compactly in its cavity that it cannot easily change its position.

If the fœtus lies head downwards, then the uterus is obovoid in shape; if there is a breech presentation, then the uterus has another shape; and yet a different shape if there is a transverse presentation.

Now, in the last two or three months of pregnancy, has the uterus altered its shape from the spheroidal to the oval or obovoid independently of the fœtus, or has the fœtus, by its very rapid growth, so changed its relation to the uterine sac that its body now fits the latter so compactly that the shape of the uterine sac is determined by the shape and position of the fœtus?

Sir James Simpson, Matthews Duncan, and all the leading obstetricians, agree that it is not until about the seventh month that the fœtus takes up its final position in utero, and that after this time the fœtus becomes less and less liable to have its position altered, either by changes in the position of the mother, or by its own muscular efforts.

From this it is quite evident that the shape of the uterus becomes fixed and determined at about the same time that the final position of the fœtus is determined. We do not know of any condition of the uterine wall which causes it to change its shape from the spheroidal to the obovoid independently of the fœtus.

The spheroidal form in the earlier months is undoubtedly caused by the liquor amnii distending the ovum, which fits the uterine cavity closely from the first.

We must allow that the form of the uterine sac in the earlier months of pregnancy is entirely dependent on the presence of the growing ovum within it. Where does this relationship cease? In my opinion it never ceases. Everything tends to show that from the beginning to the end of utero-gestation the shape of the uterine sac is entirely dependent on the ovum or on the essential part of it, namely, the fœtus.

What is it that determines pregnancy? Is it not in every case the fertilization, growth, and development of the ovum.

The uterus is merely the vascular surface on which the young

growing ovum is placed, and by which it is surrounded. A fertilized ovum may develop in the Fallopian tube, or between the layers of the broad ligament, or even in the peritoneal cavity among the coils of the intestines. As the ovum develops it may distend the Fallopian tube till the latter bursts, and it may then grow downwards between the layers of the broad ligament. In such a case it is the growing ovum and fœtus that give shape to the vascular sac which encloses them. In every case where an ovum grows it gives shape to the cavity in which it is enclosed.

Sir James Simpson in his paper has given drawings to show that the uterus assumes a certain shape, and that the fœtus, in order to adapt itself to this shape, folds its limbs on its body in a peculiar way. He would have it that the folding of the limbs of the child on its body results from its efforts to adapt its shape to the shape of the uterine sac, or, in other words, that the peculiar shape of the uterine sac is *first* brought into existence, and then the fœtus folds its limbs on its body, in order that it may adapt its whole body as compactly as possible to the shape of the uterine sac—thus, when the uterus assumes the obovoid form, the child's legs are so drawn up and placed against its body that the breech end of the child, with the folded limbs, fits into the large upper end of the uterine sac, and this arrangement brings about, in 96 cases out of 100, a head downward presentation.

It has been observed that the fœtus in an extrauterine gestation has exactly the same form, and has its limbs folded on its body in exactly the same manner as in the case of an ordinary uterine gestation; and it is important to note the fact that the fœtus in the liquor amnii *before the sixth month* has its limbs folded on its body, and the same thing is observed with all fœtal animals.

It is quite impossible before the sixth month that the shape of the uterine sac can cause the limbs to be folded on the body, for at this time the uterus has not lost its almost spheroidal form. It has not at that period assumed that shape which Sir James Simpson asserts determines both the shape and position of the fœtus in utero.

I do not think any one will contend that the shape of the sac in an extrauterine gestation determines both the shape and the position of the fœtus, and yet the limbs lie folded on the body as naturally as if the child was enclosed by a healthy uterus in a natural gestation.

In the development of the human ovum the limbs of the fœtus develop just as do the limbs of all vertebrates. Little buds appear at the sides of the body, and grow forward at right angles to the general axis of the body. The two upper buds form the rudimentary arms or upper extremities, while the two lower buds are the beginnings of the lower extremities. Both pairs of buds continue to grow forward for a time. In the case of the upper extremities the two palmar surfaces face and lie parallel to each other, while

in the case of the lower limbs the two plantar surfaces face and lie parallel to each other. After a time both palmar and plantar surfaces turn inwards and then downwards, and as the limbs grow downwards they become jointed and fold up on the body. This takes place long before the fœtus is of such a size that the uterine wall can in any way affect it, either as regards its shape or position; and in cases where there is a large excess of liquor amnii we find that the child's limbs are folded just as compactly as if it had fitted the uterine cavity in an ordinary gestation.

Ovarian, parovarian, and other cystic tumours, when distended by liquor amnii, or by other fluid, as a rule assume an almost spheroidal form; and there is good reason for believing that the uterine sac would also assume a spheroidal form, as it does in the earlier months, even at the ninth month of pregnancy, were it distended by liquor amnii alone, instead of by the fœtus. And, lastly, it appears to me quite impossible that the thin uterine sac in the last weeks of pregnancy, filled with fluid, could exist

ERRATA.

Page 91, line 31, *for* "child's head" *read* "child."
„ 98, „ 7, *for* "Figure 9" *read* "Figure 10."
„ 102, „ 4, *for* "keep" *read* "keeps."
„ 102, „ 17, *for* "rami" *read* "ramus."

we satisfied with Matthews Duncan's theory that gravitation is the true cause of the head downward presentation? For my part, I do not think any theory is satisfactory which, while it attempts to give the cause of the 95 per cent. of head downward presentations, does not at the same time explain how it is that there are at least 75 per cent. of first cranial positions among these head downward presentations.

I shall now endeavour to show that the muscular power in the lower limbs of the fœtus is the main factor in determining the head downward position of the child in the later months of pregnancy, and that this same power is also the chief factor in determining the first cranial position after the head downward position has been assumed.

In the first place, let me say a few words about this muscular power in the lower limbs of the fœtus. To demonstrate this power I have frequently performed the following experiment: As soon as possible after a child has come into the world, and the

cord has been tied, I have taken it to a foot-bath half filled with tepid water. The child is then placed, belly upwards, on the palms of my hands, the latter being held just over the water in the bath. It will be noticed that the child lies with its lower limbs placed on the abdomen. The child, still lying on the palms of the hands, is carried horizontally towards one end of the bath until the soles of the feet are brought in contact with the cold metallic surface. Generally, directly the soles of the feet touch the cold metal, the limbs start forward with a sudden jump, and this sudden act of extension of the lower limbs against the resisting side of the bath causes the child's body to glide forward off the palms of the hands into the water, showing that if any resistance meets the soles of the feet while the limbs are being thus quickly extended, the body of the child is forced to go forward. It will also be observed that in this act of extension the limbs are also somewhat abducted.

Now, without going deeply into the muscular anatomy of the young child's limbs, it is quite certain that the glutei muscles are powerful extensors, and at the same time abduct the limbs in the act of extension. The extensors on the front of the limbs also play an important part in thus causing rapid extension of the lower limbs. If this powerful act of extension of the lower limbs can take place a few minutes after the child is born, it is quite certain that it can also take place in utero long before the full term of gestation is completed.

Sir James Simpson says,—"The position of the fœtus is, I believe, certainly the result of movements which itself performs in utero; but these movements are not of a volitional, and consequently mental origin, but simply of a reflex or excito-motory character."

It is in the experience of all that the child's lower limbs frequently press outwards with such force that the mother's abdomen is made to stand out in a conical projection at the spot where the feet lie. We must all allow that after the fourth month of pregnancy the child gradually acquires such an amount of muscular force in its limbs that, if it lies free in the liquor amnii, it can move about by such muscular power. It does move about when the mother suddenly changes her position, and also by its own muscular efforts. I do not question whether these muscular movements are volitional or of a reflex character; they are probably of the latter nature, as Sir James Simpson has declared, but what I want to insist on is this, that as soon as the fœtus has become possessed of the power of forcibly extending its lower limbs, if it has any resisting surface to push against while in the act of extending its legs the body must go forward. The fœtus in utero at the fifth month is so slightly heavier than the liquor amnii that a very slight force applied to one end of it causes it to move forward, as ballotment shows. Now there comes a time, probably

about the sixth or seventh month, when the relation of the fœtus to the uterine cavity is such that the child cannot extend its limbs without causing the head to glide forward along the curved inner smooth surface of the uterus. It is about this time onwards that the position of the head over the os uteri begins to be taken up more and more frequently and certainly. Dubois has shown that while before the end of the sixth month the proportion of head presentations amounted to 55 in the 100, during the course of the next month they were found already amounting to 82 in the 100, and at the full time they amount to 96 or 97 in the 100.

About the fourth month, when the child has little or no muscular power in its lower limbs, as it lies free in the liquor amnii its heaviest end will certainly gravitate to the lowest part of the uterine sac; but after this, when the limbs have gained muscular power and the fœtus has such a relation to the uterine cavity that it cannot extend its limbs without bringing them in contact with the inner surface of the uterine wall, the position which gravitation has given to the fœtus can be and is frequently upset, and this same muscular force in the lower limbs may for a very considerable time counteract the tendency to the head downward position which gravitation is always trying to effect, for, as Matthews Duncan has shown, directly the fœtus is at rest, the heaviest end of it has a tendency to glide to the bottom of the uterine sac.

That the fœtus is continually moving about in these early months of pregnancy is admitted by all observers, and pregnant women will tell you that they felt "kicking" in all parts of the womb, sometimes below and sometimes above, for many months before the full time. This "kicking" means that the feet and sometimes the hands have come in contact with the uterine wall.

Now, it is true that in a number of gestations the fœtus from the first assumes a head downward position as the result of gravitation, and may never move from that position; but there is a certain percentage of cases in which the position taken up as the result of gravitation may be altered either by accidents to the mother or by the strong muscular movements of the limbs of the fœtus. The lower limbs and the power which resides in them are placed at one end of the fœtus, while at the other end of the fœtus is a smooth, globular-shaped head which can very easily glide over the smooth, curved inner surface of the uterine wall. There is also this peculiarity about the head of the infant, the muscular power in the neck is so weak that the child before birth cannot support its head on its shoulders, and the head will thus wobble to one side or the other. If the child's body is held out horizontally, the head will gravitate downwards. The attachment of the head to the spinal column is also so peculiar, that if the fœtus is lying on its back in utero and the limbs are extended, when the

head is thus pushed against the wall of the uterus the chin will be made to approximate the sternum, and thus the back of the head will glide forward over the inner surface of the uterus during the extension of the lower limbs.

The shape of the uterus in the early months of pregnancy is globular, and during these early months the fœtus will gravitate head downwards to the bottom of the uterine sac; but as soon as it is able to extend its legs forcibly, the position which gravitation has given to it may be altered. This is especially likely to occur when the mother is lying on her side, at which time the pregnant uterus is almost horizontal; and there comes a time when the relation between the uterine sac and the size and power of the fœtus is such that the latter cannot forcibly extend its lower limbs without causing the head to glide forward over the inner curved surface of the uterus. That same force which may change a head downward presentation—the position determined by gravitation in the early months—into a breech or other abnormal one will ultimately change the abnormal presentation into the normal one again. Such is the curve of the inner surface of the uterus, that as the extensor force in the lower limbs is applied to one end of the fœtus, the other or head end is forced to follow the curve of the uterine wall, and will sooner or later be directed downwards.

In the case of a head downward presentation in the last few weeks of pregnancy, the head of the child is of such a size and shape that it fits closely the lower part of the uterine sac which is surrounded by the bony pelvis, and during the further extension of the child's limbs upwards against the uterine wall the head becomes more and more fixed in its position, just as a ball is over a bony cup, and in such a position it is almost impossible that it can glide away out of the cup, because the more powerfully the child extends its limbs upwards the greater is the downward pressure and the frictional resistance between the head and the lower part of the uterine sac supported by the bony cup, and in this way the final position is maintained.

The change from the abnormal presentation, however produced, to the normal one is simply the result of the extension of the lower limbs against a more or less resisting surface. The lower part of the uterine sac being surrounded by the bony pelvis with its ilia, offers most resistance to the feet of the child during the forcible extension of the lower limbs; and when the head, bending on the sternum, comes in contact with the inner curved surface of the uterine wall, it is quickly directed downwards, and at a certain point this downward movement is assisted by gravitation, and the natural head downward position is taken up.

Though the extensor force in the lower limbs of the child is the means by which, in the earlier months of pregnancy, the head downward presentation is frequently changed into an abnormal one, the same force, in the later months of pregnancy, is also the

means by which the abnormal is again changed into the natural or head downward presentation, and is also the chief means by which the final presentation, in all positions of the mother's body, is maintained.

It is admitted that before the sixth month the living child lies in utero in a variety of ways, and that after that time the final position begins to be taken up with more and more certainty. Is gravitation not acting with the same force during the whole of intrauterine life? Certainly it is; but at a certain period of intrauterine life a new force comes into existence, which constantly upsets the position which gravitation has given to the child when in a state of repose.

If gravitation is the only cause of the head downward presentation, how is it that the child before the sixth month is found presenting in so many ways? There must be some force at work constantly disturbing the position which gravitation gives to the child, to account for the numerous presentations in the early months of pregnancy. In these early months, when the child lies in a state of repose, but has free room to move in, gravitation will determine that the head end of it will lie lowest in the uterine sac in all positions of the mother; but from the time when the child begins to use its lower limbs, as a frog does in the act of swimming through a liquid medium, there is a constant tendency for the position which gravitation has given to the child to be upset; and, as Matthews Duncan says,—"If this occurs at a time when its dimensions are beginning to approximate to those of the uterus, having overcome resistance of the uterine walls by the force of its own muscular efforts or otherwise—as by accidents to the mother—it may not gravitate back to its old and ordinary position, and thus a preternatural position may be produced." This, I contend, is exactly what does take place very frequently; but this preternatural position is in constant danger of being again converted into the natural one by the same means that produced it, namely, by the muscular power which exists in the lower limbs of the fœtus. In the later months of pregnancy, when the child lies in a preternatural position, however produced, and its body is supported by the sides of the uterine sac, owing to its dimensions having approximated those of the uterus, gravitation would tend, while it is in a state of repose, to maintain it in that position, but the power which the child has of propelling its body forward by the use of its lower limbs, in the way I have described, sooner or later brings about the result that the head end, or heaviest end of the child, is again directed downwards, when gravitation again not only assists in directing it downwards, but also assists the muscular force at the other end of the child in maintaining it in its final and natural position.

Gravitation alone could not account for 95 per cent. of head downward presentations. The essential factor in producing this

large percentage of head downward presentations is the muscular power which resides in the lower limbs of the fœtus.

Now, all these movements of the fœtus take place quite independently of any efforts on its part to fit itself most comfortably into the uterine sac.

These muscular movements are not made with the object of determining a head downward position of the child, or of putting its body into the most comfortable position in utero, but this head downward position is the natural and ultimate consequence of the child's head gliding along the inner curved surface of the uterus while its body is being propelled forward by the forcible extension of the lower limbs against a more or less resisting and opposing surface. In this way the assumption of the natural or head downward position of the child is a vital act. Death of the child in utero at any period may result in any presentation, normal or abnormal, according to *physical* laws.

It follows, from what has been said, that the uterine sac will ultimately assume that shape which results from its embracing and enclosing the body of the fœtus in the various positions in which it may lie; or in other words, the form of the uterine sac in the last days of pregnancy is determined by the form and position of the contained fœtus.

The head downward position having been in this way brought about, we must not suppose the child's limbs are now at rest. After the seventh or eighth month it is very unlikely that the child can alter this head downward position by any muscular movements; but it is quite certain that it has the power of moving its body from one side of the uterine sac to the other, and these movements are caused by the extension of the child's lower limbs against an opposing and resisting surface. The anterior limbs also may in some degree assist in these movements; but I do not attach much importance to the power in the anterior limbs to effect movement of the child's body, as it is so feeble in comparison with the power that resides in the lower limbs.

If you look at Figure 1 you will see that Sir James Simpson has depicted the child as lying in utero, not only in the head downward position, but with its body packed away in the left half of the uterine sac, with its back turned to the mother's left side, and the child's head evidently in that position which at the commencement of labour will be called the first cranial position. He tells us that this position results from the child making continued efforts to adapt its body to the shape of the uterine sac, and that when it lies in this position it is comfortable and as free as possible from irritation; but he does not tell us why, if the uterine sac is of the shape he has described, the child's body is not just as frequently found lying in the right half of the uterine sac, or in some other position than the one he has depicted.

Why is the child's body not just as frequently packed away in

Fig I

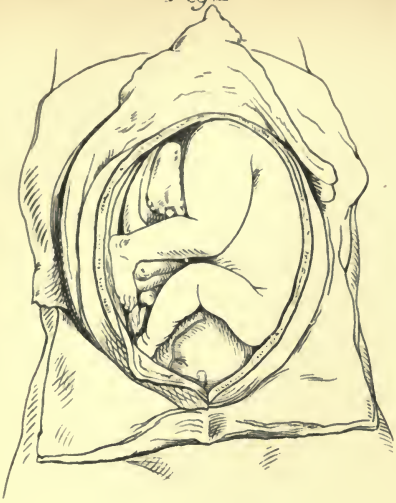


Fig 2

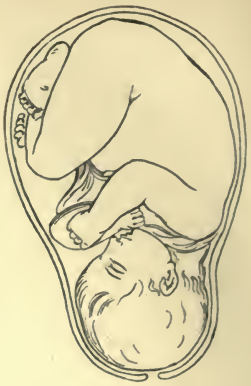


Fig 3

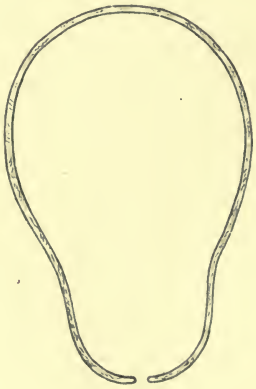


Fig 4

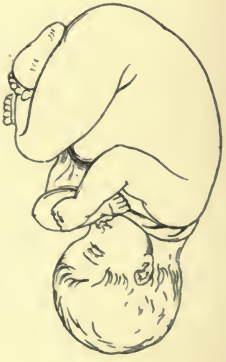


Fig 5

Fig 6

Fig 7

Spin Proc XI
Spleen
Stomach

Fig 8

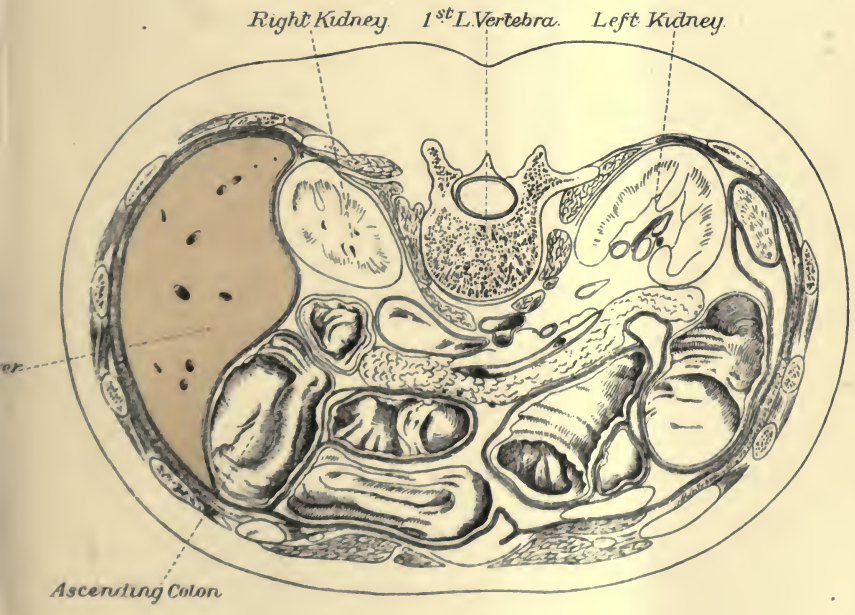
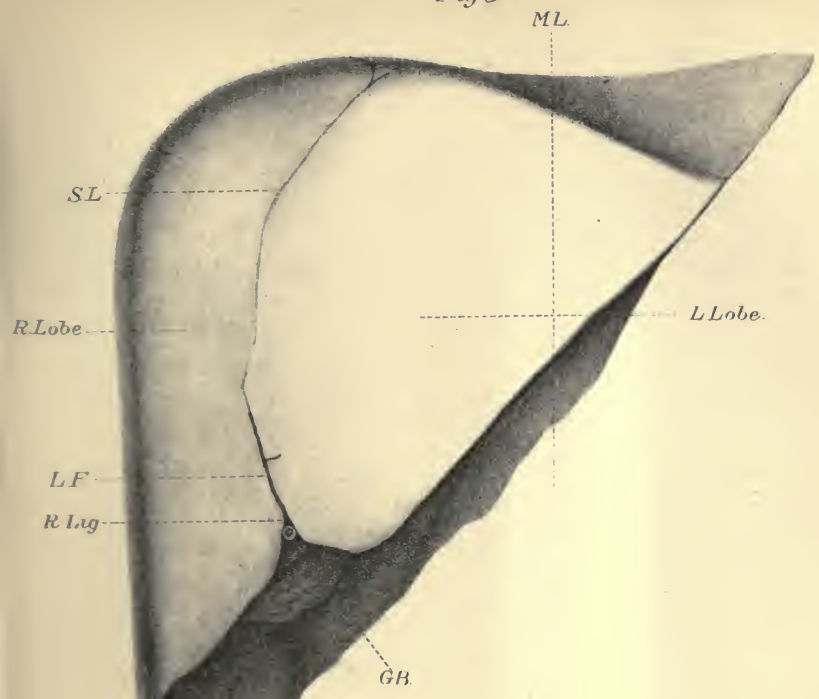

Right Kidney
1st L Vertebra
Left Kidney
Ascending Colon

Fig 9


ML
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L Lobe
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R Lug
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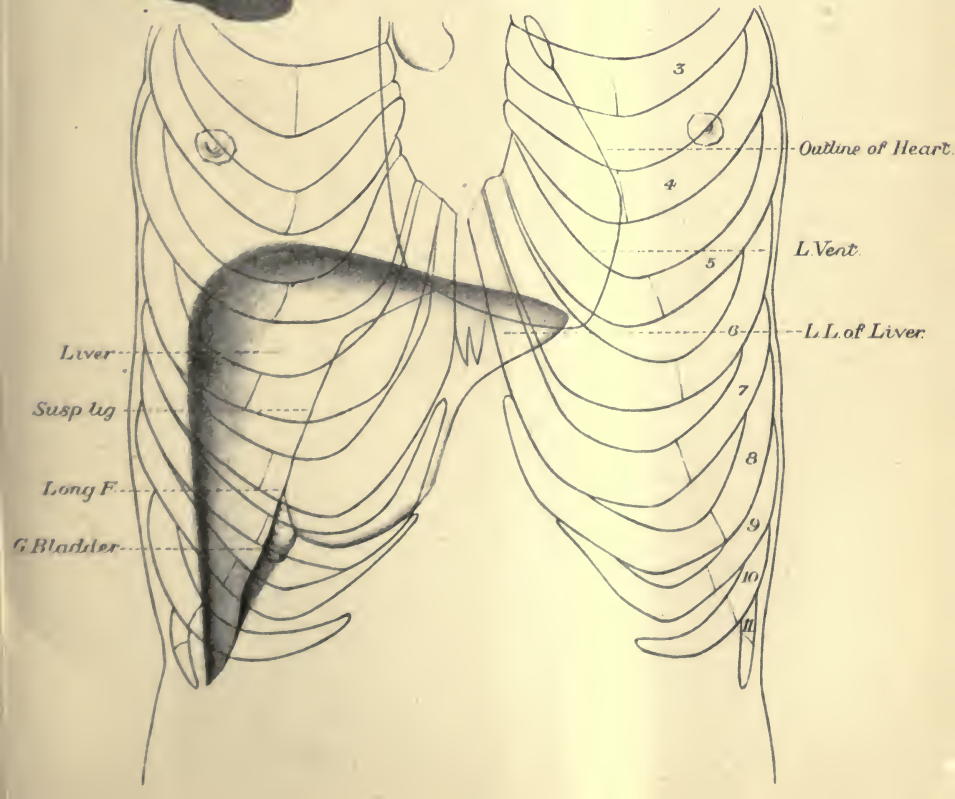
Fig 10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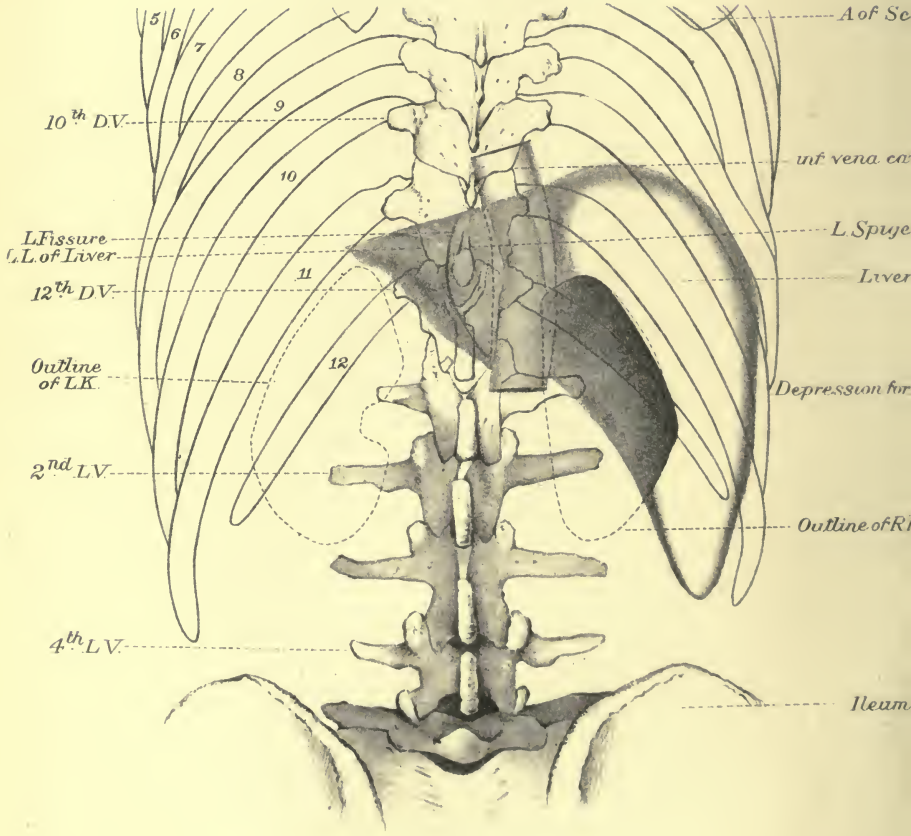
Outline of Heart
L Vent
L L of Liver
Liver
Susp lig
Long F
G Bladder

Fig 11


5
6
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10th D.V.
L Fissure
L.L. of Liver
12th D.V.
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inf vena ca
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the right half of the uterus? If the natural shape of the uterine sac is obovoid as he has described it, the breech or obovoid end of the child ought just as frequently to fit into it in one way as in another,—the child's back ought just as frequently to be found in the right half of the uterus as in the left half in the last weeks of pregnancy. There must be some simple explanation of the fact that the child's body is thus so frequently found packed away in the left half of the uterus, with the head in the first cranial position. I have long since come to the conclusion that this position of the child's body and the first cranial position of its head is the result of muscular movements in its lower limbs after the child has assumed the head downward position in the way I have described.

Several years ago, when assisting Dr Thos. Keith in his ovariotomy operations, on two occasions I had the opportunity of seeing the liver in the abdomen of women in the living and natural condition. At the time I was much struck by the size of the organ lying in the right hypochondrium. I think there can be little doubt that the liver in the female when pregnant is larger than at any other time.

Lately Braune and Symington,[1] by means of horizontal sections through the frozen body, have taught us much as regards the position, size, and movements of the liver.

In speaking of the position and relations of the liver with regard to the pregnant uterus it will be necessary to refer to the investigations of Braune and Symington, and that this may be done all the more easily I have reproduced some of Braune's plates as well as the figures used by Dr Symington in his work.

In the first place, Figure 7, which is an exact though reduced copy of Braune's plate xiv., shows in section the mass of the liver and the space occupied by it in the abdominal cavity of a man "at a level near the under surface of the eleventh dorsal vertebra."

Figure 8, which is a reduced copy of Braune's plate xv., shows us in section the size of the liver and the space occupied by it in the abdominal cavity of a man at a level of the middle of the first lumbar vertebra.

Figure 9, which is taken from Dr Symington's work, shows "the anterior aspect of the liver of a female child aged one year and three months, with the stomach distended." This figure shows better than words can describe the shape and position of the liver in the child, and if you look at the line marked M L you will see how large a mass of the liver lies in the right hypochondrium during distension of the stomach by food or gas.

Figure 10 shows "the anterior aspect of the body of a man aged 57 years, from the level of the seventh dorsal vertebra to the

[1] Braune's *Topographical Anatomy*, and Symington "On certain Physiological Variations in the Shape and Position of the Liver."

umbilicus. The stomach and splenic flexure of the colon were distended." Dr Symington says, "In this case the liver was not at all enlarged, yet the right lobe reached on the right side lower than the kidney, a condition which is certainly not regarded as normal."

Figure 11 shows the posterior aspect of the body of the same subject as that shown in Figure 9.

In speaking of the general form of the liver, Dr Symington says, "Whether the stomach be empty or full the liver always retains its general form, which is that of a triangular prism. The transverse diameter is, however, considerably diminished and the vertical extent on the right side increased by a distension of the stomach. This increase in a vertical direction is what one would naturally expect from the compression of a plastic mass like the liver placed between a distended stomach and the right lateral wall of the abdomen."

I have nothing to say with regard to the movements of the liver when the stomach is distended with food or gas; but enough has been said to show that the liver occupies a very large part of the right hypochondrium in the pregnant female, and that the border of its right lobe is to be found as low as the margin of the ribs from the ensiform cartilage downwards, and, posteriorly, this right lobe overlaps the right kidney. The mass or space occupied by the right lobe of the liver at the level of the middle of the first lumbar vertebra may be appreciated by referring to Braune's plate xv., of which a reduced copy is given in my Figure 8. And there can be no doubt that in the pregnant female in the last months such is the size, form, and position of the liver that it forms a sort of cap to the pregnant uterus, covering it over especially on the fundal, back, and right lateral portions, though not actually in contact with it at any part.

If we now turn to Braune's plate xxix., which represents "a vertical section of the body of a woman 25 years of age in the last month of pregnancy," we shall find that he describes the position of the pregnant uterus as follows:—"The level of the fundus corresponds nearly to the under border of the first lumbar vertebra. A more accurate definition cannot be given, as the highest position of the uterus was not included in the section, as it inclined more to the right side."

If we now turn back to Braune's plate xv., or to my Figure 8, we shall see how large a part of the right hypochondrium is occupied by the liver at the level of the lower border of the first lumbar vertebra, which, according to Braune, is the height to which the fundus of the uterus reaches in the last month of pregnancy. And if we look again at Braune's plate xiv., or at my Figure 7, we shall see how large a mass of the liver lies over the fundus of the uterus at a level of the under surface of the eleventh dorsal vertebra.

From a study of these plates we can see for ourselves how great a mass of the liver lies over the fundus, and to the right, and to the back of the uterus in the last month of pregnancy. With regard to the height to which the fundus rises, Playfair says, about the seventh month the fundus of the pregnant uterus "is about two inches above the umbilicus. During the eighth and ninth months it continues to increase until it fills the entire abdominal cavity, the summit of the fundus being immediately below the ensiform cartilage." "Towards the end of pregnancy the whole of the anterior surface of the uterus is in contact with the abdominal wall, its lower portion resting on the posterior surface of the symphysis pubis. The posterior surface rests on the spinal column, while the intestines are pushed to either side, the large intestine surrounding the uterus like an arch." And Braune in his plate xxix. depicts the pregnant uterus resting on the spinal column and in contact with it as high as the second lumbar vertebra.

The upper part of the pregnant uterus thus rests on the spinal column of the mother, and is supported above and to the back and to the right side by the liver, which lies over these parts in the form of a cap, such organs or parts of organs as lie between the liver and the uterus rather assisting the liver in thus capping the uterus.

If we now look at the left hypochondrium in the pregnant female, we shall find that there is no organ in that region which can in any way give support to the upper and left parts of the uterus in the way that the liver supports the uterus in the right hypochondrium.

Now, when the child has assumed a head downward position, the head at first may lie with its long diameter in any position over the pelvic brim. It is only towards the last months that the final position is taken up with more and more frequency; but it is necessary to point out that in a large number of cases the child's head falls naturally into the position from which it may not again move—a position in which the long diameter of its head coincides with the oblique diameter of the pelvic brim, the occiput pointing to the left or the right pectineal eminence, as the case may be. The child may tumble into a natural head downward position, with its back to the left side of the uterine sac and its occiput pointing to the left pectineal eminence, the long diameter of its head lying in the oblique diameter of the pelvic brim. From this position it may never again move, because in the last months of pregnancy, as it extends its legs upwards and outwards to the right (see Fig. 1), directly its feet come in contact with a resisting surface, as the uterine wall supported by the liver in the right hypochondrium, the child's chin, owing to the obstacles to progress in front of the head, is made to approximate the sternum, and the occipital portion descends sufficiently into the bony pelvis to become more or less impacted, as a ball in a cup,

and thus the favourable position of the child in utero is maintained in spite of its own muscular movements and changes of position on the part of the mother.

In the greater number of instances, after the head downward position has been assumed, the head may rest on the rami of the pubis, or in the iliac fossæ, the final cranial position not being taken up until long after the head has taken the downward position; but as the child grows larger and its body comes to fit the uterine cavity more closely, and it gains greater power in its lower limbs, just in proportion as these things take place so there is a greater tendency for the child, by the use of its lower limbs, to push its body away from the right side to the left side of the uterine sac.

The uterine sac in the last weeks of pregnancy is an unresisting membranous envelope, except when it is in a state of contraction. The feet of the enclosed child can easily push this wall before them in the form of a conical projection. It bulges outwards when pushed by the feet of the child, and although in the last weeks of pregnancy the uterus shows constant powerful rhythmic contractions, at intermediate times it is lax and limp, and may be easily bulged out by the feet of the contained child.

Now, it is clear that that part of the uterine sac which lies to the right of the spinal column in the right hypochondrium, and is supported by the liver in the way I have described, must offer more resistance to the pushing force of the child's legs than any other part of the uterus in its upper half. This being so, there is offered, as it seems to me, a simple explanation of the fact that the child in the last weeks of pregnancy is so often found with its back to the left side of the uterine sac, and its head with its long diameter coinciding with the oblique diameter of the pelvic brim; for as soon as the child has come to lie head downward in utero, there is a constant tendency, owing to the obliquity of the uterus, for its body to gravitate forward against the abdomen of the mother, and the child's legs in the act of extension are brought in contact with the uterine wall, either to the left or to the right of the spinal column of the mother. From what has been said, if the child's feet push against the uterine sac to the left of the spinal column, the probability is that the uterine wall will bulge back into the left hypochondrium, and the child's body may not change its position, in consequence of the uterine wall at this point being unsupported; but should the child's feet push against the upper part of the uterine sac to the right of the spinal column, its body will move away from its position towards the left side of the uterus. And it is easy to see that if the child's body is thus pushed away towards the left side of the uterine sac, it is very likely to be kept in its new position by the continued extension of the child's legs against the same resisting surface, which in the first instance caused the body to be moved away to the left. This

position becomes more and more fixed as the child becomes larger and is more straitened for room; for there comes a time at last when a very slight extension of the child's legs brings the feet against the most resisting part of the uterine sac in its upper part.

The vertical abdominal muscles of the mother also assist in keeping the child in this position by compressing the uterus in an antero-posterior direction. As I have already pointed out, in a certain number of cases the child falls head downwards with its occiput pointing to the left pectineal eminence in the way I have described, so in a certain number of cases the child tumbles head downwards with its occiput pointing to the right pectineal eminence, and the long diameter of its head coinciding with the oblique diameter of the pelvic brim. From this last position the child *may* never again move, owing to its head being fixed in the pelvic brim; but there is a constant risk of such a position being altered, especially in the earlier months, when the child has more freedom of movement than in the later months. By the extension of the child's limbs against the uterus in the right hypochondrium, the child's body and head may be made to glide away over to the left side of the uterine sac; and when once there, it is seldom that the position thus gained is lost, for the continued extension of the child's limbs only has the effect of more tightly fixing both the body and the head in their new position, as has been already pointed out.

When the mother is in the vertical position, owing to the obliquity of the pregnant uterus, the back of the child sooner or later gravitates to the front of the mother's abdomen, the head at this time may be resting on the symphysis pubis, or on one of the rami of the pubis. It is easy to see that, by the forcible extension of the child's legs backwards against the uterus in the right hypochondrium, the body will be made to glide away to the left side of the uterine sac. In the act of extension the child's limbs not only push backwards but also upwards, because this act of extension is simply an attempt made to straighten the limbs. The child's body moving away to the left side also moves in a downward direction, because of this upward and backward extension of its limbs against the resisting surface.

If the mother is lying on her back in bed, the child's body still shows the same tendency to glide away to the left side of the uterine sac, because the limbs in the act of extension will sooner or later push against the uterus in the upper part of the right hypochondrium. In all positions of the mother, horizontal or vertical, there is still the same tendency of the child's body to be pushed away to the left side of the uterine sac by the extension of the child's legs against the most resisting part of the uterus in its upper half.

In some cases those muscular movements which determined the head downward position of the child in the first instance are so

directed at first that the child at once assumes this natural position in the left half of the uterus with its back against the left side of the mother. If its size holds a certain relation to the size of the uterus, then any further extension of the child's limbs not only keep it in its place, but entirely prevents this position being lost during changes of position on the part of the mother. After the child comes to lie head downward, there is no reason why the long diameter of its head should not lie over the oblique diameter of the pelvic brim just as often with the occiput pointing to the right as to the left ileo-pectineal eminence. It would in all probability do so if there were not some disturbing cause which is constantly at work altering the position of the occiput from the right to the left ileo-pectineal eminence.

I do not say that the child's head always lies over the pelvic brim as soon as it has taken the downward presentation. As I have already stated, it may lie on the symphysis pubis or on either rami for a long time after the head is down; but there is a constant tendency in the later months for the head to slip off these parts, so as to lie over the brim of the pelvis in one or other of its long diameters; and I say that there must be some disturbing cause at work to prevent the head being found just as frequently in the left as in the right oblique diameter. That disturbing cause is to be found in the extension movements of the child's lower limbs, which result in the child's body being pushed away as far as possible from the surface which offers most resistance to the lower limbs in the act of extension.

The conclusions which I have arrived at are as follow:—The head downward position of the child in utero is the necessary and ultimate consequence of the continued extension of the child's lower limbs against the most resisting parts of the uterine sac. The first cranial position of the child's head is the necessary and ultimate consequence of the continued extension of the child's lower limbs against the most resisting part of the uterine sac in its upper part—namely, that which lies in the right hypochondrium—after the child has assumed the head downward position.

Professor Simpson said the subject was one of perennial interest, and while he felt obliged to Dr Foulis for again bringing it before them, illustrated on this occasion by limelight illumination, he must take exception to the drawings used. The drawings are compounds of diagrams, and are entirely theoretical. Dr Foulis should have used Braune's frozen sections, when we could have seen the position of the liver in relation to the gravid uterus. Professor Simpson referred to experiments that had been made by sinking dead fœtuses in a solution of salt, by which it was found that the head sank lowest in those that were born head first, and in those born breech first the breech sank lowest. Dr Foulis is

right in saying that the uterus moulds easily, but it is not a membranous sac, and the more tonic it is the more ovoid it becomes. The fœtus accommodates itself in the most comfortable position. Why is the head lowest? Dr Foulis comes near the truth in maintaining that the lower limbs have something to do with it. Professor Simpson thinks that the upper limbs have also some influence. The lower limbs, however, are more powerful, they act in consort, and are placed at the extremity of the child. In pelvic presentations the feet by striking against the brim may bring about a change of the presentation. In primiparæ it has been observed that no change in the presentation takes place during two or three weeks, in multiparæ it is different. Professor Simpson believes that the limbs have also an influence in keeping up the presentation of the fœtus.

Dr Berry Hart thinks Dr Foulis is in error in quoting Dr Symington's paper in support of his theory, as Dr Symington maintained that the liver is mobile and plastic, and therefore could not play the part that Dr Foulis assigns to it. Dr Hart holds that the uterus will press the liver instead of the liver pressing the uterus. He has not made up his mind as to the cause of presentations, but he leans to the gravity theory, and thinks that intra-abdominal pressure may also have something to do with it. He thought it a pity that Dr Foulis had not used accurate drawings.

Dr Martin thought the kicking out idea was all too ludicrous. As the fœtus is expelled by the uterus, he held that the uterus governed the position of the fœtus in utero. In order to have any movement a stimulus is required to be sent down from the medulla. Gravity has something to do with presentations, but the essential is the vitality of the uterus.

Dr Thyne could not understand how the liver could act as a resisting point, as it lies high up out of reach, and the intestines are between it and the uterus.

Dr Foulis said that in regard to Dr Thyne's difficulty, we must bear in mind that all the abdominal organs are in close contact with each other. He held that during the last weeks of pregnancy the gravid uterus is capped, so to speak, by the large liver, such parts of organs as lie between the liver and the uterus assisting rather than otherwise in thus capping or supporting the uterus in the right hypochondrium. During inspiration, the liver with the parts below it press against the gravid uterus in the right hypochondrium. Dr Symington had clearly shown that the liver descends as far as the margin of the ribs on the right side, and that posteriorly the liver descends so low as to cover half of the right kidney. No one would question the correctness of Dr Symington's observations; and as regards Dr Foulis's lime-light illustrations, as these were photographs of Dr Symington's drawings, he could not see why Prof. Simpson and Dr Hart should object to

them. If it could be shown that the liver was so far apart from the gravid uterus as to offer no support to it in the right hypochondrium, then Dr Foulis's view would go to the wall. He could not believe that the uterus moulded the child into any position, and he was surprised to hear that Professor Simpson still taught, as the late Sir James Simpson did, that a malposition, such as a breech or transverse one, was the result of a malformation of the uterus. Dr Foulis maintained that the head downward position of the child was brought about by the extension of the lower limbs, and that as soon as it took the head downward position, the same extension of the lower limbs brought the feet into contact with that part of the uterus which was supported by the liver in the right hypochondrium, and thus the child's body was caused to glide over to the mother's left side. It was further kept in that position by the continued extension of the lower limbs, and by the action of the mother's abdominal muscles. Ballotement showed us how easily the child's body could be made to move in utero. Dr Foulis could not admit that the anterior limbs had anything to do with the causation of this position, except as the result of mere accident, and they were just as likely to oppose as assist the lower limbs in the extension process by which the child's body was pushed over to the left side of the mother's body, as the first step towards assuming the L.O.A. position.

MEETING VI.—MARCH 14, 1888.

DR UNDERHILL, *President, in the Chair.*

I. *Dr Brewis* showed a VESICULAR PLACENTA sent by Dr Adams Brewis, Leeds. The patient miscarried at the fourth month. Labour was preceded by pain and a discharge of blood. The uterus reached the umbilicus; no child could be felt by abdominal palpation. Internally through the right lateral fornix a boggy feeling was made out. The placenta presented and was expelled by uterine contractions in detached pieces. There was no trace of the fœtus. The patient had been five times pregnant. The first pregnancy went to full time; the child was stillborn, but patient does not know why; the labour was a natural one. The second and third pregnancies went to full time; the children were born alive and were healthy. The fourth pregnancy ended in abortion at the eleventh week due to a fall on the ice. There is no history of syphilis.

II. *Dr Thomas Wood* showed an ENTIRE FŒTUS born at the eleventh week.

III. ON ALCOHOLISM IN GYNÆCOLOGY AND OBSTETRICS.

By J. Matthews Duncan, M.D.

In this paper my object is to state roundly what I know or believe in this subject, all being the result of combined observation and reading. The literature of alcoholism is pretty copious, ranging over a long period of time, and the gynæcological and obstetrical relations of it are by no means neglected. But as in the subject generally, so in the special relations of it there is great need of further investigation and increased exactness of reasoning. And, unfortunately, it cannot be alleged that there is any deficiency of materials for the student. Yet the present paper does not ambitiously propose, even in part, to make good what is awanting. It merely aims at adding some new observations to the general stock, and at concentrating the gynæcological and obstetrical details of this grand disease.

Not a word is necessary to show the importance of the subject, for this poison and some of its results are well known in the science, and cases are most grievously frequent in all departments of practice in all classes of the community. "If (says Linnæus) I were to enumerate all the diseases which owe their origin to spirituous drink, there would be no end of my discourse."

I have had little experience in peripheral alcoholic neuritis, sometimes producing a kind of paraplegia. Duckworth[1] says it is more common in women than in men.

The weakening influence of chronic alcoholism upon the sexual desire and sexual potency of men has been noticed by several authors, among whom I may mention Huss[2] and Lancereaux, who describe it as coming on (in women as well as in men) when symptoms of muscular weakness and of diminished sensibility of the extremities appear; and these words, probably, are a foreshadowing of the only recently known peripheral neuritis above referred to. Lippich is quoted by Huss as having shown, by the numerical method, that the marriage of a soaker produces on an average 1·3 children, while that of a non-soaker produces 4·10; so that soaking suppresses two-thirds of the children which would on an average be produced in a marriage. Roesch[3] confirms the view of Lippich, and describes the testicles of soakers as sometimes atrophic, and the penis and scrotum relaxed. He has observed the testicles reduced to the size of a haricot or a pea, and drawn up to the inguinal ring. Lancereaux[4] has found morbid modifications of the epithelium of the canaliculi, and the vesiculæ seminales having in their unhealthy fluid contents few spermatozoa and the sympexions of Robin, as in old men—a premature senility.

[1] *St Bartholomew's Hospital Reports*, vol. xxii. p. 253, 1886.
[2] *Chronische Alkoholskrankheit*, Stockholm und Leipzig, 1852, p. 331.
[3] *Annales d'hygiène publique et de médecine légale*, tome xx., 1838, p. 84.
[4] *Dict. Encyclop. des sciences médicales*, tome ii. p. 667.

The influence of chronic alcoholism on the structure of the ovaries has attracted even less attention than the little devoted to that on the testicles. This has arisen, no doubt, partly from the paramount characters of the changes induced in the liver, partly from the more hidden seat of the ovaries, partly from neglect of their condition in autopsies of drunken women, and partly from the quite recent introduction of the bimanual method in the very modern development of gynæcology. No doubt, every organ and tissue of the body is modified in structure by chronic alcoholism, and attention has been too exclusively directed to changes in the liver. This is easily explained by the accessibility of the organ to examination, the grossness of the changes produced, and most of all by the easily traced injurious effect of such changes on the general health and on the continuance of life.

It is generally admitted that portal congestion, whether from obstruction by cirrhosis or not, is a cause of menorrhagia in drunkards; and it may be fairly said that this is or was recently the only special morbid result of chronic alcoholism in women generally known to physicians. Now, attention is directed to close physical examination of the genital organs themselves, and specially of the ovaries, with a view to elucidating the subject of this paper; and I may here state my strong assurance that the ovaries are as liable to functional disorder as the liver, and much more readily and frequently changed, in conditions easily appreciated by the practitioner, than is that organ.

Though the influence of disease of the ovaries is not so potent or important as that of the liver on the health of the individual, it has to be recognised as very important in that respect, and as having, quite beyond that of the liver, grand bearings on population, in respect both of its number and of its quality. What is the comparative potency of alcoholic disease of the testicles and of the ovaries on population we have at present no definite means of even guessing, but it may be safely judged that that of the ovaries is paramount on account of the much greater part taken in reproduction by the female than by the male. Bruhl-Cramer is said by Roesch to assert that the influence of the father's drunkenness on the production of idiot children is greater than that of the mother, but no ground is given for the assertion, nor is it made clear whether the alleged prepotency of this male influence is the result merely of a numerical preponderance of male drunkards, or of the special prepotency in this respect of the male over the female element in conception.

The universally known causal relation of chronic alcoholism to renal disease needs no remark, further than that it is by many pathologists held to be less in women than in men, in accordance with an assumed but surely very imperfectly demonstrated law that the female sex is less liable to be injuriously affected by chronic alcoholism than the other.

In women, alcoholic inflammatory troubles in the pelvis, of the kidneys, ureters, bladder, and urethra are not very rare, and I have an impression that they are more frequent in women than in men. They may be sometimes missed in making a full or complete diagnosis, as they may take only a share in the constitutional disturbance produced by them in association with other diseases; and as they are, at least sometimes, marked by an urgency of local symptoms less than is observed in cases of equal local severity produced by other causes.

Fournier[1] says that certain spasms of the neck of the bladder and catarrh of the organ have been specially signalized as consequences of alcoholism, and he quotes Civiale as describing some vesical catarrhs, though fewer than might be expected, resulting from abuse of spirituous liquors. Civiale had seen only three well-characterized cases in which inebriety appeared to be the principal if not the only cause. Lancereaux[2] describes vesical catarrh as common among drunkards, and he has several times found the bladder enlarged, dilated, the mucous membrane thickened, red or grayish, dotted with black points caused by pigment deposited around hypertrophied glands; and he adds that a similar alteration is sometimes found in the ureters and in the pelves of the kidneys. Lecturing[3] on vaginitis, I mention the not very rare occurrence in drunken women of subacute inflammation of the kidneys, bladder, urethra, and vagina, and add regarding two cases, one in advanced pregnancy, another in a woman above sixty, that "both had purulent vaginal discharge, both had urethritis, which in the old woman was so severe that you could bring out pus from the orifice of the urethra. Both had irritable bladder and albuminous urine, this secretion being in the old woman sometimes tinged by blood. In both the vaginitis was an unimportant part of the disease compared with the affection of the urinary organs; and this latter justly attracted almost the whole attention of the practitioner. In such cases," I add, "the urine is of low specific gravity, opalescent, and remaining opalescent after standing; it deposits mucus, with phosphates and lithates. The microscope detects pus, bladder epithelium, and epithelium of the ureters. Albumen is thrown down on boiling."

Many writers have described menstrual disorder of all kinds as arising from chronic alcoholism apart from portal congestion; and Lancereaux particularly mentions premature cessation of menstruation, seemingly connecting this with the observation in several cases of smallness of size of the ovaries, and principally of the cortical or glandular parts of them. Such statements, though having a small value, are lamentably vague, and I have only similar statements to add to the discussion of the subject, but they are made

[1] *Nouveau dict. de méd. et de chir. prat.*, tome i. p. 664.
[2] *Dict. Encycl. des sciences médicales*, tome ii. p. 667.
[3] *Clinical Lectures on the Diseases of Women*, 3rd edit., p. 165.

from large experience and confirmed by clinical bimanual examination.

The injurious effect on the ovaries is frequently observed in women who are plump or fat, and have no great disorder of general health; and, for the evil result, it is not necessary that the women be, in the ordinary sense, intemperate, but only using spirituous drinks largely, soakers in a moderate degree.

While every variety of menstrual disorder may certainly occur, my experience indicates menorrhagia as by far the most frequent.[1] The menorrhagia is a loss prolonged rather than excessive within the limits of an hour or a day. It may possibly be dependent on a degree of endometritis corporis, but I know no means of proving this in the present state of gynæcology. Such endometritis may be part of, or an accompaniment of disease of the ovaries, which is quite easily detected. The ovaries are usually to be both felt, generally enlarged, tender, smooth surfaced, and having circumambient diffused swelling and imperfect fixation, sometimes to such a degree as to suggest the presence of adhesions. That all this is a true view of such cases is copiously attested by the complete recovery of healthy conditions in cases not already of too great duration, when alcoholic drinks are totally abstained from; and, not rarely, such recovery is further attested by supervention of pregnancy, this condition of the ovaries frequently preventing or arresting fertility, though it does not invariably do so even when well marked and distinctly affecting both glands. That this chronic ovaritis, as it may be justly termed, may terminate, as has been suggested, in cirrhotic atrophy, I have no reason to doubt, neither have I any ground for asserting it.

As a contribution to this matter I quote from the *Transactions of the Pathological Society of London*[2] a communication by Dr Norman Moore, with relative report.

"The ovaries (says Dr Moore, describing a specimen) are large, dense, and smooth on the surface. The microscopic sections show great thickening of the tunica albuginea and of the perivascular connective tissue. This change is especially distinct in the zona vasculosa. Numerous Graafian follicles, small and large, are visible, but all have a more or less shrunken appearance.

"The liver shows great increase of fibrous tissue, with extensive atrophy of the liver cells. The organs were those of a married woman, aged 41, who died in St Bartholomew's Hospital, under the care of Dr Church, of cirrhosis of the liver, with ascites. The kidneys were not diseased.

"Dr Matthews Duncan has suggested that interstitial change in the ovaries is a cause of sterility in intemperate women, and Mr Lawson Tait speaks (*Diseases of Ovaries*) of cirrhosis of the ovaries,

[1] See the author's *Clinical Lectures on Diseases of Women*, 3rd edit., p. 212, and *Sterility in Women*, p. 126.

[2] Vol. xxxv. p. 248.

but very little is to be found in authors as to the nature or frequency of the condition.

"The ovaries were referred to the Morbid Growths Committee for report.

"*March 4th*, 1884.

"*Report of the Morbid Growths Committee on Dr Norman Moore's specimen of Enlarged Ovaries in connexion with Cirrhosis of the Liver.*

"The ovaries submitted to us are larger than natural, but their texture having been altered by preservation in spirit, we are unable to speak definitely of the appearances they originally presented to the naked eye.

"We have examined the microscopic specimens, and find that they show a general increase in all the constituents of the ovary. The cortex is much denser than normal, and the density is due to an increase of fibrous tissue, which is closely arranged, and contains but few nuclei. The greater part of the rest of the ovaries is composed of cells, similar in shape and size to the nuclei of involuntary muscle fibre. These are imbedded in a homogeneous matrix. The vessels are notably abundant; many of them have very delicate walls. Corpora lutea in the later stages of development are present.

"We do not find any of the small round connective tissue cells met with in cirrhosis (as, for example, in the liver in the present case), nor any other evidences of a chronic inflammatory process.

"We are therefore disposed, from these appearances, to think that the enlargement of the ovaries in this case is more of the nature of an hypertrophy than of a chronic inflammation or cirrhosis.

CHARTERS J. SYMONDS.
ANTHONY A. BOWLBY."

"*April 24th*, 1884."

After operations women who are in a condition of chronic alcoholism are, like men, liable to nervous delirium of varying degrees of severity, and to well-characterized delirium tremens. On this affection I shall enter more fully when I treat of it as complicating the puerperal state. Dupuytren,[1] recognising the analogy with delirium tremens of what he calls the nervous delirium of the operated on, says that women are less liable to it than men, and on this point I express no opinion. I have seen it, in various degrees, after uterine operations, and lately well-marked delirium tremens occurred in an elderly patient after the use of Paquelin's cautery, in destroying a small growth on the cervix of

[1] *Leçons orales de Clinique Chirurgicale*, tome ii. p. 234, "Il ne sera pas sans intérêt de parler ici du delirium tremens qui offre une grande analogie avec le délire nerveux."

a uterus which was enlarged to the size of a cocoa-nut, apparently by a fibroid in it. The delirium began on the second day, was severe for two days, and did not quite disappear till after a week had elapsed since the operation.

While, in my own experience, I have not made observations of injurious influence of chronic alcoholism on women in pregnancy and parturition, apart from the tendency to miscarriage or premature labour, it is yet probable that such bad influence is exerted, and I quote the testimony to this effect of Dr Kirk.[1] "For my own part," says he, "I am convinced that indulgence in alcohol beyond the most moderate extent is frequently in the last degree disastrous to a pregnant woman and her progeny." "I have now," he adds, "seen cases of fatal rupture, fatal inversion of the uterus, and fatal post-partum hæmorrhage in habitually drunken women. I believe there is a marked tendency to hæmorrhage, more especially in such subjects." Before Kirk, Joseph Frank[2] described bad consequences as occurring in lying-in women.

In the puerperal state of women in a condition of chronic alcoholism, the occurrence of the nervous delirium of Dupuytren is far from rare, and of it I have seen several examples; the occurrence of delirium tremens is extremely uncommon, and of it I know only one case which occurred recently in my own practice. It seems to me that this statement, as to a unique case, probably gives an exaggerated idea of the rarity of the disease; yet that it must be very rare I cannot doubt, seeing that I have had more than forty years of large experience in midwifery, and that, during all that time, I have had considerable familiarity with obstetric literature.

It is scarcely necessary here to say that the injurious influence under discussion is that of chronic, not of mere acute alcoholism; that produced by habitual drunkenness, or slight but long-continued soaking, not that produced by a single or an occasionally repeated debauch.

Delirium tremens is a well-known disease, with its sweatings, its overpowering terrors, and their accompanying violence: it needs no description. The nervous delirium of the operated on, and of lying-in women, is a disease much less striking in its characters, yet it is scarcely liable to be confused with the delirium symptomatic of fever. Not only has it characters less striking than those of delirium tremens, but it is also much more the subject of variations of degree. It may be so slight as scarcely to attract notice, or it may be severe and alarming; yet it appears to me to be, perhaps always, distinct from the regular delirium tremens.

It is very difficult to picture the condition of patients in this nervous delirium of chronic alcoholism in a few sentences, and the

[1] *Glasgow Medical Journal*, Dec. 1885, p. 409.

[2] See *Huss. Chronische Alkoholskrankheit*, 1852, p. 331.

words of Dupuytren[1] and of Fournier may be well adopted with this object. The former speaks of its first period as characterized by agitation, anxiety, insomnia, loss of appetite, nausea, vomiting, hallucinations of hearing, sight, and touch, rarely much thirst, little fever, and tremblings only occasionally. Fournier[2] giving a fuller statement fails, as he himself admits, to keep quite true to the distinction from delirium tremens. "As to the nervous delirium of the operated on, described by Dupuytren, it approaches," he says, "to delirium tremens by so many of its characters that it seems to deserve being confounded with it. But there are more delicate cases where the delirium tremens runs the risk of being mistaken. When it complicates an acute affection, it is often difficult to differentiate it from febrile or symptomatic delirium. A minute study of the phenomena is then indispensable, and even this is not always sufficient entirely to remove doubt. In general, symptomatic delirium does not present the violence, nor the agitation, nor the need of movement, nor the interminable loquacity of the delirium ebriosum; and, further, it has not the unquiet and perplexed character; it is less subjected to sensorial troubles, and hallucinations especially take less part in it; it does not present the same bizarre mixture of just ideas and of wanderings; it does not admit in the same degree of giving place to a momentary return of the reason under the influence of a diversion somewhat active; finally, it is much more rarely complicated with trembling and persistent insomnia."

It will be observed that Fournier speaks of nervous delirium complicating an acute affection. That this may occur there can be no doubt, but what I wish here to remark is, that in all the well-marked cases that have come under my observation there has been a slight degree of an acute affection, which I would as readily describe as complicating the nervous delirium. This has been observed even in the slightest cases, and it was so in the case of delirium tremens. The affection is briefly described as a parametric swelling and induration, with tenderness, not becoming extensive or persisting, or causing much alarm.

It is certain that delirium tremens is very much rarer actually in women than in men; and this comparative rarity is so great as to justify the belief that women are less liable to it than men. In other words, this comparative rarity justifies the belief that the same amount of inebriety in women and in men will have as a consequence far fewer cases of delirium tremens in the female than in the male sex. But fuller demonstration of this belief is desiderated.

The disease is not restricted, as a complication, to the recently operated on: it occurs in medical cases, as of pneumonia, as well as in surgical cases. Lancereaux,[3] believing the nervous delirium

[1] *Leçons orales*, tome ii. p. 234.
[2] *Nouveau dict. de médecine et de chirurgie pratique.* tome i. p. 653.
[3] *Loc. cit.*, p. 693.

of Dupuytren, Albers de Breme, and Lind, to be delirium tremens, cites Grisolle, Rayer, Briquet, Schmidt, and Chansing, as describing its occurrence in medical cases, and as supervening on the seventh or eighth day, not at the beginning of the disease, or during convalescence. He adds that, of 636 cases in the Duchy of Nassau recorded by J. B. V. Frank, 117 occurred in the course of various diseases and injuries. In pneumonia, 50; in compound fractures, 11; in pleurisy, 7, etc.

The puerperal state may be described as partaking of characters both medical and surgical. The following case began, as in medical cases, on the seventh day.

Mrs R., 31 years of age, 11 years married, has had six children and three miscarriages, was attended by Dr Mack at the birth of her seventh child, in which there was nothing unnatural. On the second day after delivery, symptoms which suggested an attack of typhoid fever made their appearance; copious peasoup stools; pulse about 120; temperature from 103° to 104°·5; manner excited and otherwise unnatural. [There did not at any time appear the eruption of typhoid.] On the fourth day of her confinement I could find no distinct local disorder to account for her peculiar condition. There was little milk in the breasts. There was some tenderness on deep pressure in both iliac fossæ; and, per vaginam, some fulness was suspected on each side of the uterus. These slight conditions remained, little modified, till the patient was convalescent, in the course of the third week after the birth of the child. The womb was slow in its progress of involution.

On the sixth day there were traces of delusions, but no other notable addition to former symptoms. At this time alcoholism was provisionally diagnosed, but inquiry obtained only asseverations of strictest temperance. Yet the nurse said her patient frequently asked for brandy. On the seventh day it was accidentally discovered that she had daily been having frequent small doses of brandy during the latter part of the pregnancy. In the evening she had regular delirium tremens. No milk in the breasts. Tongue has whitish fur and is red along the middle line. A large opiate did not procure sleep. On the ninth day the vivid delusions disappeared, she was rational [but an excited, unnatural manner continued for some days longer]. Temp., 101°; pulse, 108; perspirations. Peasoup diarrhœa continues. After this I learned that she slowly recovered health and strength.

The subject of the influence of chronic alcoholism on the quantity and quality of the progeny of those affected has attracted a great amount of attention; and, while there is unanimity as to the great extent and great potency of the injurious influence, it must be admitted that the subject, on its scientific side, requires much further observation and inquiry. Much difficulty arises from the imperfection of evidence, from the intervention of two parties in

each case, and from the uncertainty as to the amount of influence of the male or of the female party, or of both. As an example of the evil of one-sided study is the restriction of my own observations almost exclusively to the female party to the conceptions. Further, before this subject can be satisfactorily treated, much more must be made out as to the relations, no doubt very close, of sterility, excessive production, abortion, premature labour, production of unhealthy children, and survival of children. On these matters I have written at some length in my Gulstonian Lectures on Sterility in Woman, and to them I beg to refer the student, wishing to avoid here much recapitulation. Only I may insist on the very close relations referred to, in order to strengthen the general demonstration by the good argument, that evidence in support of one of these results of chronic alcoholism is also evidence in support of the others.

Sterility, whether absolute or relative, is often a result of habitual drunkenness, and I have already cited the evidence of Lippich on this point. In practice cases are not rare where fertility ensues on change of habit to that of total abstinence from spirituous liquors; and again cases are not rare where fertility is arrested by soaking, and returns on the bad habit being given up. You rarely (says J. P. Frank) see a woman who drinks much have many children; or, if she has, they generally die soon.

Many authors attest the influence of chronic alcoholism in inducing abortion, miscarriage, or premature labour. In his dissertation on the drunkenness of women, Michæl Alberti,[1] after quoting Riedlinus in his support, says that innumerable instances establish the truth that a woman who is addicted to drunkenness often aborts or brings into the world premature children and children which have the most terrible diseases. To the same effect write J. P. Frank,[2] and also Joseph Frank as quoted by Huss.[3]

Mrs S. was married at 19, and rapidly had one abortion and five children, of which the last was born when she was 24 years of age. About this time she acquired drunken habits and became very ill, the liver being enlarged, with ascites, and latterly amenorrhœa. In the early part of this drinking period she had three abortions about the third month. After about seven years of the bad habit she, in order to save her life, became a total abstainer, and her health was completely restored. She soon became pregnant, and then came under my care. She bore her child naturally, and made a good recovery. This child was born eight years after the last living child, and when she was 32 years of age. About two years after the birth of this child she again fell into bad

[1] See Frank. *System der Polizey*, i. Band, S. 556.

[2] *System einer vollständigen medicinischen Polizei. Zweite Auflage*, 1784, S. 555.

[3] *Chronische Alkoholskrankheit*, 1852, p. 331.

habits, and could not be restrained. She became once more pregnant, and had albuminuria, uræmic eclampsia, and miscarriage about the sixth month. Soon after she died of renal disease.

Mrs T., now 32 years of age, was married at 19, and had five children, of which the last was born in her 27th year. At this time she became much addicted to drinking; kept her bed very much; had great loss of power in the lower limbs; and her liver became considerably enlarged. The bad habit had continued for nearly six years, when I was called to see her, and during these years she had had six early miscarriages. I recommended, and succeeded in securing, total abstinence from alcoholic drinks. She soon regained her health, and in less than a year bore a living child, which was soon followed by another. Since its birth I have not heard of her.

Mrs Y., a soaker since her marriage in early life, was sterile, and is sterile after eighteen years of married life. To this statement has to be added the occurrence of a miscarriage about the fifth month. This, the only conception, occurred at the close of a long yachting expedition of several months, taken with a view to ensuring complete abstinence from spirituous drinks.

The baneful influence of inebriety in the parents does by no means end with the birth of the offspring. That of the mother is, in an especial manner, continued by suckling; but the exact mode of conveyance by the milk is not established. Duquesnel,[1] indeed, cites Charpentier and others as having observed nurses who took alcohol passing a quantity of it in their milk sufficient to have a marked influence on the child; but he gives no evidence in support of the statement, nor reference to it. On the other hand, Felix Hoppe-Seyler[2] quotes Béchamp,[3] as showing that quite fresh milk of women and of asses contains a little alcohol; and he adds,[4] that he is not aware of any chemical demonstration of the passage of this substance from the nurse to the suckling, mentioning at the same time, and evidently incredulously, the alleged intoxicating influence on the latter.

The belief is very ancient that inebriety exerts great injurious influence on population. The Carthaginians and Romans are said[5] to have interdicted newly-married women from the use of wine, lest the fœtus should get harm. Hippocrates is said to[6] have recognised the belief. Riedlinus, as already referred to, says that if drunken women conceive they either bring forth before the full

[1] *Nouveau dict. de méd. et de chirurgie prat.*, tome xx. p. 76.
[2] *Physiologische Chemie.* Berlin, 1881. S. 733.
[3] *Comptes rendus*, tome lxxvi. p. 654.
[4] *Ibid.*, S. 758.
[5] J. P. Frank. *System einer vollst. med. Polizey*, ii. Aufl., 1784, S. 556.
[6] *Dict. Encycl. des sc. méd.*, tome ii. p. 668.

time or produce feeble children that scarcely live a few days, and he knew a woman who was not very often intoxicated who had seven children, of whom not one survived. Roesch[1] says that children procreated in drunkenness have almost always a seed germ of disease; and among diseases to which they are liable he mentions convulsions, hydrocephalus, phthisis, atrophy, scrofula, and rickets. Huss[2] says it is a quite common and fully established observation, that children born of parents given to drink are weak and morbid, and often die in early life. Howe[3] says he has found that the children of parents addicted to intemperance are often scrofulous. "There is one effect of alcohol on the child," says Kirk,[4] "which I have observed so often that I regard it as altogether undeniable. . . . I have noticed that the children of notoriously drunken mothers were often born in a remarkably emaciated state, and were sometimes diminutive in every sense. Such children might be tolerably healthy and quite free from any cachectic appearance; but the striking thing about them was, that not only were they small at birth, but they did not grow, and at five years of age might look like children of two or three. I have seen," he adds, "numerous instances of this sort, and the amount of race degeneration which takes place in this way is probably considerable."

Vulcan is regarded as owing his deformity to inebriety in one of his parents; and there are several authors who ascribe deformity of ordinary mortals to the same source, and Kirk goes the length of saying that few will be disposed to deny this special injurious influence. On this subject Lancereaux[5] gives a fuller statement than any other author I have met with. "The material disorders," says he, "which are the result of alcoholic heredity consist of inflammatory lesions of the nervous centres which vary according to the time of life when they are produced. It is therefore important to study them in the fœtus, the infant, and the adult. During the embryonic period, these disorders, leading to modifications of the elements destined at a later period to constitute one of the important parts of the cerebro-spinal centre, oppose the development of this part and may come to be the point of departure of malformation of the encephalon, and in particular of that which is known as anencephali. Dr Demeaux, and some other observers, have in fact reported examples of this kind of malformation which they believed to be justly attributed to alcoholic excess in the parents. When they supervene in the fœtus or in youth, the hereditary disorders of alcoholism are recognised by lesions which resist the complete development of organs. It is fair so to regard certain partial atrophies, most frequently unilateral, of the cerebral hemispheres,

[1] *Ann. d'hygiène publique*, etc., tome xx., 1838, p. 84.
[2] *Chronische Alkoholskrankheit*, S. 331.
[3] *On the Causes of Idiocy.*
[4] *Glasgow Medical Journal*, 1885, p. 409.
[5] *De l'alcoolisme.* Paris, 1878, p. 29.

described by Breschet under the name of agénésies. These atrophies by arrest of development, present the characters of sclerosis ; they are generally accompanied by deformity of the head, more or less marked, according to the state of the bones of the cranium, by epilepsy, and by hemiplegia, with atrophy of the skeleton of the paralyzed limbs. At other times both hemispheres may be affected, the head is very little developed, the cranium is small ; there is microcephaly and a general very imperfect development. In these circumstances, the degenerated being, the product of a drinker, walks with difficulty, he is sometimes paraplegic, and often an idiot or an imbecile. Try to trace back the antecedents of infants or of adults which present these pathological disorders, and you will find that, in many cases, the parents have fallen into excess in alcoholic drinks, and that these drinks have played a principal part in the genesis of the accidents with which the infants have been struck. . . . Excess in alcoholic drinks may, therefore, be counted among the causes of infantile paralysis ; but epilepsy especially appears to us to be a frequent result of the inebriety of parents ; and that which leads us to accept this view is the peculiar conformation of epileptics who have in their families alcoholic antecedents. In reality these individuals are ordinarily small, sometimes large and thin, almost always incompletely developed, they present in general the attributes of the state known as infantilism. The cranium and the upper part of the face are symmetrical, and sometimes there is a hemiatrophy of the whole body. The head is small, and the expression of the face strange and sad."

That these observations of deformity and imperfect development believed to arise from chronic alcoholism are important, no one can doubt, whatever may be the amount and force of the evidence of their causation. They are mostly concentrated around the nervous system, and this circumstance adds to the strength of the evidence; for observations of functional disease of the cerebro-spinal system are the most prominent in the treatises on alcoholism, and the evidence of its dependence on this chronic intoxication is fuller and better.

Speaking of this evil influence of inebriety, Devay[1] remarks, that "in ancient times it was a dogma received and unanimously propagated by physicians and philosophers. 'Young man,' said Diogenes to a stupid child, 'thy father was very drunk when thy mother conceived thee.' When the Greeks represented the deformed Vulcan as born of Jupiter inebriated with nectar, they expressed the organic inferiority of children conceived in the delirium of drunkenness. Observations collected by Hufeland, Burdach, Edouard Seguin, Prosper Lucas, Roesch, etc., have demonstrated that children procreated during the drunkenness of the parents may be born with a general obtuseness of the senses, and are affected with idiocy."

[1] *Mariages consanguins*, 1862, p. 9.

Michæl Alberti, already quoted, says that children born of drunken women have the most terrible nervous diseases. Roesch cites Mason Cox as having observed an inclination to insanity and idiocy, and Friedrich as holding that the majority of children begotten in drunkenness become idiots. Howe,[1] giving statistics of the causes of idiocy, writes:—"By inspection of the tables, it will be seen that out of 359 idiots, the condition of whose progenitors was ascertained, 99 were the children of drunkards."

Demeaux[2] writes that "peculiar circumstances have given him opportunity to observe in his practice a goodly number of epileptics. Among 36 patients submitted to his observation in twelve years, and of which he was able to make out the history, he satisfied himself that five of them had been conceived, the father being in a state of drunkenness. He had observed in the same family two infants affected with congenital paraplegia, and was assured, by the precise statements of the mother, that conception had taken place during drunkenness. In a young man, 17 years of age, the subject of mental aberration, and in an infant idiot, five years of age, he again found the same cause." Vousgier[3] is said to have made two new observations supporting those of Demeaux. Ruez is cited by Devay[4] as having shown, from statistics of the causes of insanity in the ancient kingdom of Westphalia, that idiocy was frequent in the populations of working miners; these being separated from their wives during the entire week, and having sexual connexion only on days of rest, when alcoholic libations are partaken of by both sexes. Dr Morel is also cited as having remarked the same thing in other countries, in France, where drunkenness was equally common in the two sexes.

"Dr Elam," says Huth,[5] "states that on the removal of the spirit duty in Norway, insanity increased 50 per cent. and congenital idiocy by 150 per cent. Dr Lannurien, of the establishment for mental diseases at Morlaix, in Bretagne, says,—"I do not hesitate to attribute the greater number of cases of idiocy in this establishment to that cause." "Dr Delasiauve," adds Huth, "instances the village of Carëme, whose riches were its vineyards, the inhabitants of which place were forced to be a little more sober in consequence of ten years' vine disease. This," he says, "had a sensible effect in diminishing the cases of idiocy."

"My attention," writes Lancereaux,[6] "being drawn to the importance of facts of this kind, I some years ago asked one of my students, M. Martin, then intern of Dr Delasiauve, to be so good as observe in this point of view the numerous epileptics which

[1] *On the Causes of Idiocy*, Edinburgh, 1858, p. 28.
[2] *Comptes rendus de l'acad. des sciences*, tome li., 1860, p. 576.
[3] *Dict. Encycl. des sc. méd.*, tome ii. p. 668.
[4] *Mariages consanguins*, 1862, p. 9.
[5] *Marriage of near Kin*, 1875, p. 219.
[6] *De l'alcoolisme*, Paris, 1878, p. 29.

constituted the service of the intelligent physician of Salpetrière, and here are the principal results of the researches which M. Martin made. . . . . Of 83 children or adults examined in this respect, 60 times the parents were found to be alcoholic; 23 times drunkenness was not made out. In the 60 families to which belonged the individuals of the first category, the number of children was 301, and of these 132 were dead at the time of the inquiry. Of the 169 surviving, 60 were epileptics; 48 had had convulsions in their youth, and 64 only could be considered as healthy. The 23 individuals of the second category belonged to 23 families, of which the total number of descendants were 106, of whom 27 were dead. Now, among the 79 surviving, 23 were epileptics, 10 had had convulsions in youth, 46 appeared to be in good health. In addition, a great number of these children were paralytic and deformed."

After all that has been produced, the want of more cogent evidence is still felt; and, as we have been dealing much with authority, it is worth while mentioning that Sir Arthur Mitchell[1] recognises its incompleteness. Dr Langdon Down[2] also, treating of the subject, remarks that it is "very difficult to get a reliable statement with regard to the influence of alcoholic intemperance." If Mitchell and Down justly appreciate the state of this evidence as to immediate descendants of drunkards, what shall we say of the more adventurous assertions of Devay and Howe as to the weakness in body and mind of ulterior generations? "Darwin," truly says Huss,[3] "goes too far when he affirms that all those diseases which arise from the abuse of spirituous drinks are continued by inheritance to the third generation, and are aggravated in each generation up till the third, with which such a family generally becomes extinct."

Dr P. A. Young said the Society was greatly indebted to Dr Duncan for his able paper, which will be the means of directing the attention of the profession more closely to this important subject. Dr Young agrees with Dr Duncan in that the condition of a soaker is a more serious one than of that of a person who occasionally drinks hard. He quotes a case in which inebriation may have been the cause of rickets. The mother, when she gave birth to her first child, was of sober habits, and the child was healthy when born and continued so. The second child was born after the mother had acquired drunken habits, and was weakly at birth, and ultimately became rickety. It is known that dysmenorrhœa is a great cause of alcoholism, and it would be a great matter if we could find a substitute for alcohol in these cases, but nothing seems to soothe so well as alcohol. It is a popular belief that

[1] *Private letter.*
[2] *Lancet*, Jan. 22, 1887, p. 163.
[3] *Chronische Alkoholskrankheit*, 1852, S. 331.

it is a good thing to give porter to mothers while suckling their infants. Dr Young thinks that if a sufficient quantity of proper food be taken that porter is unnecessary. It had been found by some authorities, who had investigated the subject, that porter and beer were injurious to the child at the breast.

The President said that Dr Duncan had made a strong indictment against alcohol: he had shown us that a number of diseased conditions, such as dysmenorrhœa, menorrhagia, repeated miscarriages, and labour followed by delirium, are due to alcoholism, and that the children born of alcoholic parents are apt to be diseased, especially in the nervous system. It is not an easy matter to prove that a patient is guilty of soaking. He knows that alcoholism is common, but believes that indulgence in opium is more common, especially among the better classes. He mentioned the case of a family, the father of which was a soaker, and all the children were healthy. In another case, in which the mother was the soaker, the first child was born healthy and remained so, while the rest of the children had convulsions. The Society was under a deep debt of gratitude to Dr Duncan for sending his valuable paper containing such clear evidence of alcoholism, and for directing our attention to the subject.

Dr Freeland Barbour mentioned a case of sterility in which the pelvic organs were normal. Both husband and wife were intemperate, and it was a question whether the intemperance was a cause of the sterility.

Dr Forbes said, unfortunately he had a considerable number of intemperate women in his practice, and his observations had led him to believe that in estimating the injurious effects alcohol produced on the progeny of such women, the state of the digestive organs is an important factor, as he had observed that many women addicted to habits of intemperance, whose digestion is comparatively good and who provide themselves with wholesome food, have strong, healthy children; whereas, on the other hand, women, also of intemperate habits, whose digestion is enfeebled and whose manner of living, particularly as regards food, is defective, produce weak offspring.

Dr Brewis said we were greatly indebted to Dr Duncan for his valuable paper, which will be the means of directing our attention to the subject, and will lead us to make a careful study of the cases which come before us. Dr Duncan said the ovaries became enlarged and tender, and also sometimes cirrhotic, in alcoholic patients, and that those conditions resulted from alcoholism. No doubt such was the case; but, on the other hand, such conditions may exist primarily, and from the pain which accompanies them lead to the alcoholic habit, and in those cases, if you remove the cause, you may also remove the effect. Dr Brewis said he had met with cases of menorrhagia with dysmenorrhœa which were undoubtedly caused by alcoholism, and mentioned a case where

the patient, who suffered from extreme menorrhagia accompanied by excessive pain, was relieved of her symptoms by being put under the care of a trustworthy nurse who withheld all stimulants. With regard to alcoholism being a cause of sterility, Dr Brewis had noticed that there was frequently an absence of sexual desire in those addicted to alcohol.

IV. SOME CASES OF PUERPERAL SEPTICÆMIA DUE TO IMPURE ATMOSPHERE.

By Charles Edward Underhill, M.B., F.R.C.P. Ed.

The four cases which are related in this paper have come under my notice in the last two years, and I record them because the poisoning in all of them seems to have been due to the fact that the women were in each case exposed to an atmosphere and surroundings vitiated by effluvia. I shall call them Mrs A., Mrs B., Mrs C., and Mrs D.

Case I.—Mrs A., a strong and healthy young woman, was delivered of her first child in October 1886; she had been for some months living in the same house with a relative who was slowly dying of cancer of the stomach, and who had the usual symptoms of that disease. He died on the same night on which she was confined, and only a few hours after the child was born. The only peculiarity about the labour was that the membranes were retained and had to be removed by the hand inserted within the uterus. The uterus was thoroughly washed out after the labour was over with a strong solution of permanganate of potash. She did well for the first twenty-four hours, but at the end of that time she shivered and her temperature rose to about 102°. I have no accurate notes of the case, and only deal with the general features. The uterus was washed out next day with 1-5000 corrosive sublimate solution, and this was done several times subsequently. She did not suffer much pain, but the abdomen gradually became tympanitic, the discharge became fœtid, the pulse and temperature continued high. On the third day her condition was made worse by a severe attack of diarrhœa, which increased her weakness, and on the fifth day she died.

Case II.—Mrs B., a healthy woman of about 25 years of age, with one child 7 months old, received into her house in July 1886 a relative, Mrs X., who had been suffering for several months from a septic cystitis. The disease was due to a suppurating cyst of uncertain origin, which had made an opening into the bladder and discharged frequently through the urethra considerable quantities of fœtid pus. Mrs X. very shortly after this began to have rigors, followed by profuse perspirations, occurring every day or every

second day, which were attended by pain, sleeplessness, and anorexia. Her temperature varied greatly within twenty-four hours, frequently rising for a few hours as high as 103°, and then falling slowly to the normal. She was, in fact, in a state of chronic pyemia, and was very thin, weak, and emaciated. Her only chance of recovery seemed to be to have the cyst opened and washed out and drained. The operation was done by Dr Keith on September 23rd, and was followed by much improvement in her general health; but a great difficulty was experienced in carrying out the drainage in a satisfactory manner. All the urine was at first passed by the abdominal wound. A catheter was then worn constantly for some time, but could not be tolerated, and had to be removed and only passed twice a day. In spite of daily antiseptic washings of the cyst and bladder, pus continued to be secreted, though in diminished quantity, for many weeks, and the drainage tube could not be removed without the recurrence of a rise of temperature. While this unhealthy draining cavity was still discharging, and Mrs B. was in constant and assiduous attendance upon her relative, she became pregnant. Towards the end of the third month of pregnancy she had a considerable hæmorrhage, which went on for two days before she paid any attention to it; on the third day she lay in bed and on a couch, and passed several clots, in one of which the fœtus no doubt came away. She was not examined at all. On the morning of the fourth day, Decr. 17th, she was awakened by a very severe pain in the abdomen and had a somewhat fœtid discharge. The uterus was then dilated with Hegar's instruments while the patient was under chloroform, and very thoroughly washed out and disinfected. Only some shreds of membranes were found in it. This was followed by no improvement in the symptoms, and a peritonitis, in all probability purulent, attended by very great pain, but comparatively low temperature, rapidly developed itself. The abdomen became tense, and peristaltic action came to a standstill. She gradually got worse, and died on the seventh day after the first occurrence of the pain.

Case III.—Mrs C., a vigorous and healthy young woman of 20, was delivered of her first child the end of Septr. 1887. The labour was an easy and natural one. She made an effort to nurse, but had very little milk, and the attempt was soon given up. She remained perfectly well as long as she remained in her bedroom, which was until about the 16th day. She was then wheeled on a couch into the adjoining room, which was used as a sitting-room. Immediately behind the sitting-room, and separated from it by a narrow passage, was a water-closet,—the soil pipe from this closet was not carried directly out into the open air, but went down through the house in close proximity to the sitting-room. The weather was at this time extremely cold, and a large fire was required in the sitting-room to keep up the temperature. On the

18th day she complained of some pains about the shoulders, and when I saw her the following day she was confined to bed and her temperature was just 100°, but excepting for the shoulder pains there was no other symptom of serious import. On the 20th day her temperature was 99°, and the pains had nearly disappeared. On the 21st day she seemed quite well. This little attack was attributed at the time to the sudden change in the weather and possibly insufficient clothing. On the 24th day she felt better than she had done at any time since her confinement, and was again wheeled into the sitting-room. Early on the following morning she was found to be feverish, and her temperature rose to 104° during the day (25th) and remained high. On the 26th day, though reduced somewhat by treatment, her temperature was again 104°. She had no symptom of any local inflammation anywhere. The heart, lungs, kidneys, and intestines were acting normally. The uterus was mobile, free from tenderness, and the small amount of discharge was free from fœtor. There was not the least abdominal pain or distension, and the bowels were easily moved by a dose of medicine. She passed a sleepless night, and next morning the uterus was washed out with a weak corrosive lotion, without any apparent effect. The temperature was kept at about 101° by large doses of quinine (two of 10 grains each, administered one three hours after the other, was found to answer best), and the following night morphia was administered by the skin. On the 28th day, the drains were examined by an expert and a leak was discovered in the pipe under the closet behind the sitting-room. The patient was immediately removed to another part of the house entirely away from all drains whatever. The result of this move was at once apparent. The temperature the following morning was 101°, but the patient expressed herself as feeling better, and though the quinine was given in smaller doses, it gradually fell during the day, and in the evening it was 99°, and the following morning, 30th day, it was normal, and did not again rise. She rapidly recovered her strength, and a week later was quite convalescent. Throughout this short but sharp illness she sweated profusely, but never had the look of serious illness which portends an unfavourable issue.

Case IV.—Mrs D., primipara, was confined on Sept. 4, 1885, after a long labour, owing partly to premature rupture of the membranes, of a child weighing 9½ lbs.; the perineum was torn, but was sutured at the time, and healed well. On the third day the temperature rose without any distinct rigor, and the lochia became offensive. There was very little abdominal pain and no distension, but she continued feverish for ten or twelve days, the temperature being very erratic, and ranging irregularly from 99° to 103°. Between her bedroom and the dressing-room connected with it was a W.C., from which at times an unpleasant odour was noticed to come, and

at the end of a fortnight, as she was still feverish, I had her removed to a room at the top and front of the house. She began to improve immediately, and made a complete though tardy recovery. As soon as she could be removed the drains were examined, and a leak of great extent was found in the soil-pipe in the area underneath her window, and a smaller leak in the region of the W.C. near her bedroom.

Remarks.—I regret that these cases, being reported to a large extent from memory, I am unable to be more precise in the details of the symptoms and course of the disease, but the main facts are sufficiently striking, and I have brought them together because they illustrate some of the dangers to which lying-in women may be exposed from impurity of the air surrounding them. In Case I. the atmosphere of the house was presumably vitiated by the presence in it of a poison in the last stage of malignant disease of the stomach, and I believe I am justified in assuming that this was the cause of the rapid onset of the septicæmia and its fatal issue. I am not aware that such a disease as cancer of the stomach has ever been proved to be a source of danger when in proximity to a lying-in woman, and I need hardly say I did not at the time foresee any such risk, though I know that the discharges from cancer of the uterus—and presumably from other openly discharging malignant sores—are in the highest degree dangerous. It did not occur to me before her confinement that there would be any danger to this woman from being delivered in the same house with a person suffering in the way described, but I feel now so convinced that this is the true explanation of the case, that I should not in future consent to allow any patient of mine to be confined in the same house with a person suffering from cancer of an organ having discharge externally, and so liable to infect the atmosphere of the house. I may add that I attended several other women shortly before this patient, and after her death, and that all went well.

In Case II. the evidence is much more conclusive. The patient miscarried in the third month, and was not in any way examined until the septic condition showed itself. The septicæmia was not due to retained membranes, as only a few shreds were removed on examination of the uterus, such as always remain after an early miscarriage. On the other hand, the air of the house was undeniably full of germs, from a long-standing and openly discharging case of chronic pyæmia, and this in spite of daily antiseptic washing out of the septic cavity and as careful an employment of antiseptic dressing as the case permitted. But who could foresee that such a condition of the air of the rooms occupied would cause a rapidly fatal attack of septicæmia in a young and healthy woman after an early miscarriage? It is true that in neither of these cases was there a post-mortem examination, which might possibly

have revealed some old-standing tubal or other disease, such as was found to be the case in some fatal cases which occurred in Queen Charlotte's Lying-in Hospital in London a year or two ago, as reported by Dr Grigg.

The previous history of my two patients, however, was known, and there had never been to my knowledge any symptoms to suggest old-standing pelvic disease, nor had there been any illness due to disease of these organs. They were both unusually healthy and vigorous women.

Case III. was a quite undoubted case of drain poisoning. Recovery went on uninterruptedly until the patient was moved from her bedroom, which was not directly affected by the sewer gas, to the sitting-room, which was in close proximity to a leaking drain. The escape of sewer gas was probably intermittent, and when she first occupied the sitting-room after her confinement, she only got a small dose of it; the disturbance was accordingly not severe. On the second occasion she must have received a much larger dose of the poison, as the effects were much more striking and alarming. I was led in this case to suspect the drains, as there was nothing else to account for a high state of fever; there was no local inflammation of any kind, and except on the hypothesis of some atmospheric poisoning, there seemed nothing to account for so serious an attack well on in the fourth week after her confinement. The effect of removal to a purer atmosphere was immediate and satisfactory, and within a few hours of her removal all anxiety was gone.

In the fourth case I suspected some sewer gas poisoning, partly from the close air of the room and the adjoining W.C., partly from the erratic and continuous character of the fever, while there was very little local inflammatory mischief to be made out.

I regret that I am unable, owing to the very imperfect way in which these cases have been recorded, to indicate any special symptoms or course of disease which may guide us to the better diagnosis of sewer gas poisoning as a factor in the production of puerperal septic conditions. I can only say that a continuous high fever without any local inflammation sufficient to account for it would make me suspicious of drain imperfection, and I would in such a case urge removal to another part of the house, or to another house altogether if possible, as the best course to pursue.

Dr Milne Murray said the subject was of the greatest importance. In cases of septicæmia we are apt to overlook the possibility of the mischief resulting from sewer gas. He mentioned the case of a patient of his who had a normal labour, and who did well until the twelfth day, when she had a rigor, and the temperature rose to 105°. Next day he found one lung consolidated; and

Dr Bramwell, who saw her, pronounced her to be suffering from pneumonia of septic origin. The drains were examined afterwards, when one drain near the lying-in room was found blocked up. Dr Murray thinks that cases of late infection are due to external sources, and one of the most important of these is sewer gas. Every care should be taken as to the sanitary arrangements, and removal to another room insisted on, when any suspicion of imperfection arises. The cases of removal mentioned by the President were followed by happy results.

Dr Playfair said the Society was greatly indebted to the President for his paper, which was very valuable in being drawn from practice, and in pointing out the extreme necessity of taking care of the patient's surroundings. He mentioned a case which went well for three days, when the patient had a rigor, which was followed by erysipelas, and for which remedies were useless. He inquired about the drains and got her removed to another room, where she soon recovered. It was found afterwards that the soil-pipe, which leaked, passed under her bedroom.

Dr Felkin had seen in Africa cases practically caused by the same conditions. It is the custom in some parts of the Sūdan for women after labour to be sewn up and tied on a bed for ten days, and to have cow's urine and ashes applied to the parts. He had seen several cases of septicæmia result from this practice.

Dr Freeland Barbour said he felt obliged to the President for the paper, which dealt with septicæmia due to a special cause. We had recently had our attention directed to another group of cases, in which the source was present in the uterus, and which could be removed by washing out. It was important that in three of the President's cases washing out had been tried without result. It was difficult to be sure that sewer gas was the cause, and the conclusion could only be arrived at by exclusion. The same difficulty existed in diagnosing septicæmia to be due to tubal disease, which could only be made out by post-mortem examination. The paper demonstrated that in the third week the puerperal patient is more apt to suffer from sewer gas poisoning than other people. Dr Barbour mentioned a case where diarrhœa set in on the third day. The discharge was sweet. At the post-mortem examination the interior of the uterus was found healthy, while a water-closet off the room gave evidence of sewer gas.

Dr Dewar pointed out that out-door maternity patients were often confined in a room with an open sink without bad results.

The President thanked the Society for the reception given to his paper. With regard to out-door maternity practice, although the surroundings are apparently unhealthy, the drain arrangements are often less dangerous than in better class houses. The sinks, as a rule, do not communicate directly with the soil-pipe. It was, in his opinion, rare for the medical attendants to carry the infec-

tion, and they often got the credit of bringing disease which was really due to drain poisoning. He had had under his care a case of erysipelas wandering for six weeks from one part of the body to another, in which the temperature went up and down, and which pulled through when the patient was removed to another room.

Meeting VII.—May 9, 1888.

Dr Underhill, *President, in the Chair.*

I. *Dr Thomas Wood* showed—(1.) Placenta born with the amnion almost entirely separated from the chorion. Mrs D., aged 25, primipara, was taken in labour on the 26th of April. When I saw her, about 7.30 P.M., I found on making an examination that the bag of membranes was presenting at the vulva in the form of the finger of a glove blown up, only larger and more expanded. On the termination of the labour, which was quite normal, and on inspection of the placenta, which separated about ten minutes afterwards, the cause of the above noted presentation of membranes was at once explained. The amnion was found to be entirely separated from the chorion, with the exception of a small patch slightly larger than a crown piece. The cord was inserted about two and a half inches from the edge of the placenta, and the patch was situated between the insertion of the cord and the placental margin. On the other side of the cord —that next the centre of the placenta—the amnion was separated for three and a half inches, and was considerably more abundant than was sufficient to surround the cord, so much so that it was found to form a loose fold on that side of it. It is thus evident that the chorion had ruptured pretty early in the labour, and allowed of the amnion containing the amniotic fluid to present through the rupture and the os uteri, and so form the appearances already described. (2.) Experiment showing that the caudal extremity of the fœtus is specifically heavier than the cephalic. This experiment is not new, only the result is so considerably different from that which is supposed to take place that I think it worth while to show it to the Society. The fluid contained in this glass vessel is a mixture composed of salt water and spirit of such a density that the fœtus which it contains neither rises to the top nor falls to the bottom, but is suspended in the centre—in fact, the specific gravities of the fluid and of the fœtus are almost if not entirely equal. The position which the fœtus assumes will therefore show which is the specifically heavier end, and this, as is here seen, is the caudal extremity. The fœtus floats in the fluid almost in a vertical position with the head uppermost.

II. *Dr Barbour* showed for Dr Halliday Croom—(1.) AN OVARIAN TUMOUR WITH THE UTERUS, removed by him on the previous Saturday. The patient had been repeatedly tapped before coming under Dr Croom's care, and had been tapped once by him some weeks previous to the operation. The cyst had, however, rapidly filled, and ovariotomy was decided on. The tumour was extensively adherent, and removal was found impossible without including the uterus as well. The latter was accordingly drawn out of the wound, the neck included in a Koeberle's clamp, and removed, the stump being treated in the ordinary way, extra-abdominally. The patient was making an excellent recovery. (2.) A SUPPURATING OVARIAN CYST. This on being tapped was found to contain nearly 100 ounces of very fœtid pus. The patient had quite recovered.

III. EARLY CONTRIBUTIONS OF ANATOMY TO OBSTETRICS.

By A. H. F. BARBOUR, M.A., B.Sc., M.D., F.R.C.P.E., Lecturer on Midwifery and Diseases of Women, Edinburgh Medical School; Assistant Physician for Diseases of Women to the Royal Infirmary; Junior Assistant Physician to the Maternity Hospital; Physician to the Women's Dispensary; Inspector of Examinations in Midwifery; Corresponding Fellow of the Royal Academy of Medicine of Turin.

IN these "Early Contributions of Anatomy to Obstetrics," we have to review the time from the foundation of medicine under Hippocrates to the end of the sixteenth century. We may group them under three periods—1. Before the Christian era; 2. From the commencement of the Christian era to the fall of Rome; 3. (after the break of the ten centuries of the Dark Ages) From 1500 A.D. to the close of the sixteenth century. Each of these periods begins with an important name—the first with Hippocrates; the second with Soranus; the third with Berengario da Carpi.[1]

FIRST PERIOD.

This period extends up to the Christian era; and, in addition to Hippocrates, with whom it begins, we have to notice the names of Aristotle, Herophilus, and Celsus.

In the history of medicine, the name from which everything dates is *Hippocrates*, the "Father of Medicine" (*flor. circa* 470–400 B.C.).[2] He dissected animals only. This probably explains the idea which prevailed in his time, and even at a much later date, that the human uterus consisted of two cavities. One of his aphorisms runs, "Male fœtuses are oftenest in the right, and

[1] We make this third period begin with Berengario and not Mondino advisedly, for reasons to be given afterwards.

[2] Aulus Gallius says that Hippocrates was a contemporary of Socrates, but older than he; the dates of his birth and death are unknown (*Francis Adams*).

females in the left."[1] The same idea is seen in the less certain Hippocratic writing, περὶ ἐπικυήσιος, in which the double cavity of the uterus is held to explain superfœtation.

The next name of interest is that of *Aristotle* (B.C. 384–322). Of him Haller, in his *Encyclopœdia of Anatomists*,[2] says, "he dissected even living animals, and, first in history, took care to have anatomical plates made, lettered just as ours are. . . . . He often compared human viscera with those of animals, so to speak, one by one, so that we cannot at all deny that this great man had some knowledge of human anatomy." Although Aristotle gives us no special description of the uterus in the human female, he evidently believed that it was bicornuous like that of the lower animals, as the following references show:—"(10.) . . . . The uterus of all animals, in which it lies near the genitals, is bifid, one half on the right and the other on the left." And, in the next paragraph, he puts the uterus of man in the same category as that of the dog, pig, horse, and horned animals.[3] Further, in speaking of the cause of difference of sex, he refers to the view that males were developed in the right, and females in the left half of the uterus.[4]

Herophilus of Chalcedon (B.C. 300) has, according to Sir William Turner,[5] along with Erasistratus, the distinction of being known to posterity as the first "who dissected and described the parts of the human body. Both these physicians flourished under Ptolemy Soter, and probably Ptolemy Philadelphus, and were indeed the principal supports of what has been named in medical history the Alexandrian School, to which their reputation seems to have attracted numerous pupils." My reason for mentioning Herophilus here is that Haller[6] says of him that "he was diligently versed in the genital organs of both sexes, and discovered the epidydymis. He points out that the os of a gravid uterus before labour will not admit a stilus. . . . . In some women he saw four veins coming from the renal vessels to the uterus—probably the spermatic vessels." As his works have not been preserved, these facts are gained from references in other writers.

The eight books of *Celsus* (B.C. 53 to 7 A.D.) contain but scanty references to female anatomy. In lib. iv. 1,[7] he says,—

[1] *Magni Hippocratis Opera Omnia* in *Medicorum Græcorum Opera quæ extant*. Editionem curavit D. Carolus Gottlob Kühn. Lipsiæ, 1827. Tom. xxiii. p. 745.

[2] *Bibliotheca Anatomica quâ scripta ad anatomen et physiologiam facientia a rerum initiis recensentur*. Lugduni Batavorum, ex officina Haakiana, MDCCLXXIV., Tom. i. p. 3.

[3] *De Animalibus Historia*, lib. iii. cap. i. On page 36 of vol. v. of *Aristoteles Opera Omnia*, Gr. et Lat., Paris 1857-1874.

[4] *Ibid.*, p. 392.

[5] Article "Anatomy" in *Encyclopædia Britannica*, 9th edition.

[6] *Op. cit.*, tom. i. p. 60.

[7] *Aurelii Cornelii Celsi Medicinæ*. Impressum Venetiis per Philippum pinzi. Sumptibus domini Benedicti fontana. Anno domini 1497, die vi. Mai.

B.C.	470—400 ?	**Hippocrates.**
	384—322	Aristotle.
	300	Herophilus.
	53—7 (A.D.)	Celsus.
A.D.	100 ?	**Soranus.**
	130—200	Galen.
	ib.	Aretaeus.
	400 ?	Moschion.
	1316	Mondino di Luzzi.
	1522	**Berengario da Carpi.**
	1543	Vesalius.
	(1552)	Eustachius.
	1561	Fallopius.
	1672	De Graaf.
	1681	Malpighi.
	1726	Ruysch.
	1730	Douglas.
	1745	Haller.
	1747	Albinus.
	1754	Smellie.
	1754	Donald and Alexander Monro.
	1757	Roederer.
	1774	William Hunter.

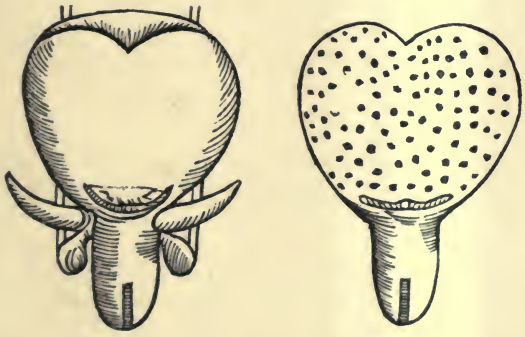
Chronological List of Names referred to in "Early Contributions of Anatomy to Obstetrics" arranged according to the year in which their Work appeared. (*For system of grouping, see text.*)

ΕΚ ΤΩΝ ΣΩΡΑΝΟΥ ΠΕΡΙ
μήτρας καὶ γυναικείου αἰδοίου.

Η

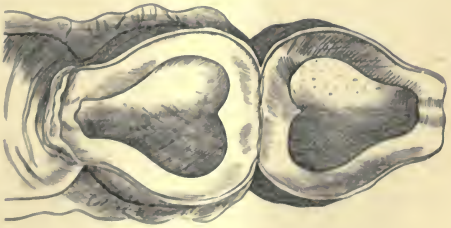
Μήτρα δὲ ὑστέρα λέγεται καὶ δελφύς· μήτρα μὲν οὖν, ὅτι μήτηρ ὀνομάζεται ἐξ αὐτῆς γυναικῶν ἐμβρύων, ἢ ὅτι τὰς ἐχούσας αὐτὴν μητέρας ποιεῖ· χοιρὰς δέ τινας, ὅτι μέτρον ὀνομάζεται πρὸς καθαρσιν δὲ ὑποτίθεται· ὑστέρα δέ, διὰ τὸ ἐσχάτην κεῖσθαι τῆς κοιλίας, εἰ μὴ πρὸς ἀκρίβειαν, ἀλλὰ χοιρὰ πλάτος· δελφὺς δέ, διὰ τὸ ἀδελφὰν αὐτὴν εἶναι γυναικῶν.

Reproduction of opening sentence from Soranus—*the MS. published in Paris in 1554.*



Drawing of uterus (reduced ½ scale) from Berengario da Carpi.

Drawing of uterus from Moschion.



Drawing of uterus (reduced ½ scale) from Vesalius

"The vulva in virgins is somewhat small. Moreover, in women, except when they are gravid, not much larger than can be embraced by the hand. It being straight and continued in a neck, called the canal (vagina),[1] rising in a line with the middle of the belly, turns thence a little towards the right hip; then, passing above the rectum, becomes united at its side to the ilia of the female. The ilia themselves are placed between the hips and pubis in the lower belly."

He writes about procidentia of the os vulvæ (lib. vi. 18); the removal of calculus (lib. vii. 4); atresia (lib. vii. 28), mentioning two varieties ("when uterine, the membrane is opposite to the mouth of the vulva; when from ulceration, it fills it with flesh"), and describing how the hymen is to be incised crucially and then cut away; but he gives no anatomical facts. And even in his lucid and judicious directions for the extraction of a dead fœtus (lib. vii. 29) we feel the same want. I draw your attention to the scantiness of female pelvic anatomy in the works of Celsus (whose life belongs to the period before the Christian era) in order to contrast it with the remarkable knowledge of the next writer, who begins what we have made our "Second Period."

Second Period.

This period extends to the fall of the Western Empire and the commencement of the Dark or Middle Ages. Besides Soranus, with whom we make it begin, we have to notice Galen, Aretæus, and Moschion.

The first great contribution of Anatomy to Obstetrics is to be found in the remarkable work of *Soranus of Ephesus*, "Concerning Diseases of Women," (of which we have now a scholarly edition by Ermerins[2])—a work which, with the exception of a single chapter, has only in this century been rescued from an undeserved oblivion most hurtful to obstetrical and gynæcological science.

The first edition of this book, as we learn from Ermerins' preface, was published in 1838 by F. R. Dietz from two codices—a Parisian of the fifteenth and an Italian of the sixteenth century. Soranus himself must have flourished a generation ("lustra aliquot," says Ermerins) before Galen, who lived from about 130 to 200 A.D., as that physician had a dispute with a disciple of Soranus.

The single chapter on anatomy was published in Paris in 1554 along with three monographs of Ruffus Ephesius. This volume is in the College of Physicians' Library. On the first page we have a quotation from Suidas, a Greek grammarian who wrote in the twelfth century A.D. a lexicon forming a kind of cyclopædia and dictionary:—"Soranus Ephesius, the son of Menander and Phœbe,

[1] Ea recta continuataque cervice quem canalem vocant. By "canalem" is evidently meant the vagina.

[2] Σωράνου Ἐφησίου περὶ γυναικείων παθῶν: Sorani Ephesii liber de muliebribus affectionibus. Recensuit et Latine interpretatus est Franciscus Zacharias Ermerins. Trajecti ad Rhenum apud Kemink et filium, 1869.

lived some time at Alexandria, practised as a physician at Rome in the reigns of Trajan and Hadrian, and composed many beautiful books:—Books about Women, four; Lives of Physicians, Selections, and Collections of Writings, ten books; and other things of interest." We have reproduced in our illustrations the opening sentence of this chapter.

Of him Haller says,[1] "Soranus Ephesius lived before Archigenes, who speaks of the Alopecia of Soranus. He was the chief of the Methodici, whom Cælius Aurelianus either translated into Latin or copied." Haller here places Soranus among the Methodists—one of the three schools into which the followers of medicine in ancient times were divided. These schools are known as the Empirical, the Rational, and the Methodist. The different standpoint of each school is thus described by Dr Adams in his Preface to the Seven Books of Paulus Ægineta. "The Empirics held that observation, experiment, and the application of known remedies in one case to others, presumed to be of a similar nature, constitute the whole art of cultivating medicine. . . . . The sect called the Rational, Logical, or Dogmatical, holding that there is a certain alliance and connexion among all the useful and ornamental arts, maintained that it is the duty of the physician not to neglect any collateral science or subject. . . . . The sect of the Methodists, rejecting altogether the consideration of remote causes, which they held to be of no importance to the cure, and giving themselves up to too bold a classification of diseases, according to certain hypothetical states of the body in which they were supposed to originate, fettered themselves too much with a few general rules, which they held to be so universally applicable that they would scarcely allow of their being modified by incidental circumstances in any possible contingency." Taking the description which Dr Adams here gives of the Methodici, we find Soranus to have been much broader than his school; and, whatever his theory was, we should rather place him alongside of Hippocrates, Galen, and Ægineta in the Rational school.

The book "Concerning Diseases of Women" consists of sixty-six sections; and his scientific arrangement and treatment of the subject are more like the nineteenth century than the second. In his preface, after mentioning other possible divisions of the subject—as into Theoretical and Practical; Hygiene and Treatment of Disease; what is according to and what is against nature; Physiology, Pathology, and Therapeutics—he says that his division is into Obstetrics and Subjects related to Obstetrics. After describing the qualifications desirable both in studying and practising the art, he says, "But since we are about to pass to the description of what occurs in women in health, we must first explain the structure of the organs, which in part can be studied directly, in part by anatomy; and although it is of no use, nevertheless, since it is

[1] *Op. cit.*, p. 71.

held to be a part of enlightened education, we shall teach what is known of it. For we shall be more readily believed when we say that anatomy is useless, if we have first shown ourselves to be acquainted with it; nor shall we provoke the suspicion that to cover our ignorance we have depreciated one of those subjects which are deemed useful." After paying this tribute to the view of his school, he gives an admirable account of the anatomy of the organs of generation. Ermerins gives the Greek text compared and revised, and also a Latin version. We have made the following translation of the chapter on anatomy from the Greek original. No apology is needed for introducing it here, so that English readers may become acquainted with this splendid and long-buried contribution of anatomy to obstetrics.

[*Translation of the Chapter on the Anatomy of the Female Organs of Generation, from the work of Soranus on "Diseases of Women."*]

Chap. III.—The Nature of the Uterus and Female Pudenda.

Uterus.—The Uterus, ἡ μήτρα, is called also ὑστέρα and δελφύς: μήτρα, because it is *mother* (μήτηρ) of the fœtuses born from it or because it makes those having it mothers, according to some because it has a *measured* period (μέτρον χρόνου) for menstruation and bringing-forth; ὑστέρα, because it exhibits its functions *late* (ὑστέρον) or because it occupies, if not exactly at any rate on the whole,[1] the *lowest part* of the female intestines; δελφύς, because it brings forth *brothers* (ἀδελφοί).[2]

Its Position.—It lies in the space between the acetabula, between the bladder[3] and the rectum, resting upon the latter, but beneath the bladder either in whole or in part according to change in its size. For in infants it is smaller than the bladder, and hence comes to be entirely under it; but in virgins at puberty it reaches the same height as the bladder. In those more advanced in age and in married persons, especially multiparæ, it is even larger so that it extends to where the colon stops. It is still larger in pregnancy, as any one can see—the peritoneum and hypogastrium being pushed forward according to the development of the fœtus with its membranes and fluids. After delivery it becomes contracted, but retains a larger size than before pregnancy. Under these circumstances, accordingly, it is larger than the bladder and does not lie right under it;[4] for, in front, the neck of the bladder projects beyond, ending in the urethra and stretched alongside of the whole vagina,[5] but falls short of the uterus above. Behind, the fundus of the uterus lies higher than the fundus of

[1] Εἰ καὶ μὴ πρὸς ἀκρίβειαν ἀλλὰ κατὰ πλάτος.

[2] Liddell and Scott give μήτηρ, *a mother*, as the derivation of μήτρα. With regard to ὑστέρα, they say that "if from ὕστερος, *the last or lowest part of the female intestines*, it cannot be connected with the Latin *uterus*, which is probably akin to ἔντερα: but more probably it *is* akin to *uterus* and not to ὕστερος." They make ἀδελφός come from δελφύς, not δελφύς from ἀδελφός.

[3] This description is evidently taken from the dissection of a cadaver in the horizontal posture.

[4] *Under*, from the dissector's point of view; *behind*, in the erect posture.

[5] Ermerins inserts καὶ παρατρυπώμενος (*and being perforated*). He says that the codex has παρατρίβομενος (*being rubbed against it, i.e., being in close contact with it*).

the bladder, being under the umbilicus; so that the cavity of the bladder lies upon the neck of the uterus and its fundus upon the cavity of the latter.

LIGAMENTS.—The uterus is connected by thin membranes, above with the bladder, below with the rectum, to the sides and behind with the parts springing from the ilia and sacrum. When these [membranes] are shortened by inflammation, it is dragged on and lies to the side;[1] when they are weakened and relaxed, it falls down: not because it is an animal[2] as some have thought; but having, as it were, a sensitiveness, and thus being contracted by astringents and relaxed by emollients. The shape of the uterus is not convoluted as in the brutes, but more like a cupping-glass.[3] For, beginning from the rounded and broad end at the fundus, it contracts sensibly to the narrow mouth. The first and projecting part of it is called στόμιον;[4] next comes the τράχηλος,[5] then the αὐχήν;[6] these last two together form the καυλός.[7] Where it broadens out beyond the constriction of the neck, we have first the ὦμοι,[8] then the πλευρά;[9] last of all the πυθμήν,[10] beneath which is the βάσις.[11] The whole space is called κύτος,[12] γάστρα,[13] κόλπος.[14] The *os uteri* lies in the centre of the female genital organs, for the cervix is closed in by the labia;[15] the os is removed from these, in some more, in some less, according to age: in adults, generally 3½ or 4 inches;[16] in those who have borne children, it comes to be nearer through elongation of the cervix. The size [of the os uteri] varies, and is in most persons normally as large as the outer end of the auditory meatus. It opens at certain times: as in the orgasm of coitus to receive the semen,[17] during menstruation that the blood may escape,[18] in pregnancy according to the growth of the embryo, and in labour to the greatest extent

[1] It is interesting to note that, even at this early period, the effect of cellulitis in causing uterine displacement had been noticed.

[2] See one of the passages quoted from *Aretaeus*.

[3] Σικύα, literally a *gourd;* then a *cupping-glass*, because shaped like the long gourd. In the edition of Celsus by E. Milligan, an ancient brazen cucurbitula is figured; but the belly is rounder and the neck is foreshortened. Celsus tells us that it was used by pouring a hot liniment into the flask, the mouth of which was then applied to the skin.

[4] *i.e., mouth*, now *os uteri*, by which term we shall translate it throughout.

[5] *Neck*, now *cervix*.

[6] *The narrow part of the neck*, now *isthmus*.

[7] The *stem*.

[8] *Shoulders*.

[9] Literally *ribs*, then *sides*.

[10] Literally the *hollow or belly of a drinking-cup;* including more than what we now call fundus, which Soranus names βάσις.

[11] The *lowest part or base*, now *fundus*. What we call the "body of the uterus," Soranus thus divides into two portions: (1), the *pleura* or sides, corresponding in position to the horns; (2), the *puthmēn* or widest part, corresponding to the rest of the body except the *basis* or fundus.

[12] The *hollow*.

[13] The *belly*.

[14] Literally a *hollow*, then a *bosom-like fold of a garment*. The term is usually restricted to the vagina, hence our word "colpitis," and is thus used by Soranus further on; here it includes the cavity of the uterus.

[15] Πτερυγώματα, literally *wings; Vide postea* on "External Genitals."

[16] Literally five or six fingerbreadths, the fingerbreadth being about $\frac{7}{10}$ inch. This is more accurate than that given in Quain's *Anatomy*, which makes it 4 in. along anterior wall and 5 to 6 in. along posterior.

[17] *Cf.* J. Matthews Duncan's *Lectures on Sterility*, London 1884, p. 131.

[18] *Cf.* Burton's "Observations on the Cervix becoming more Patulous during Menstruation," *Brit. Med. Jour.*, 1884, ii. p. 607.

until it will admit the full-sized hand. In texture, it is soft and fleshy in virgins, like the sponginess of the lungs or the smoothness of the tongue; but in those who have borne it becomes more callous, like the head of a polypus, or, as Herophilus[1] says, like the end of a bronchus—becoming hard through the passage of discharges and by parturition.

Structure.—The whole uterus is as far as possible fibrous,[2] not composed of fibres alone, but also of veins, arteries, and flesh. Of these, the fibres come from the membranes of the spine, but the arteries and veins from the vena cava and the large artery lying on the spinal column—for two veins spring from the vena cava and two arteries from the large artery, of which one vein and artery run towards each kidney; but before these enter the kidneys they bifurcate, two branches going to each kidney and two embracing the uterus, so that the latter receives four vessels—two arteries and two veins.[3] From these, an artery and vein pass to each ovary.[4]

Ovaries.—The Ovaries grow out from the side near the isthmus about opposite to the middle of the uterus.[5] They are not of firm consistence, are glandular, and are covered with their own membranes. In shape they are, unlike the male organs, long and somewhat flat; and are round and broad at their base. The spermatic vessel from the uterus is carried out of each ovary, and, being placed along the sides of the uterus as far as the bladder, enters into the neck of the latter.[6] Whence it appears that the seed of the female, inasmuch as it is poured out, does not play a part in the production of life. Of this we shall speak when we treat of the seed.[7] There are some, amongst whom is Chius, who say that there are suspensory ligaments for the ovaries; and we have seen the same with our own eyes in a woman suffering from hernia, in whom during the operation the ovary fell down through relaxation of the vessels which support and surround it, and with these the suspensory ligament came down.[8]

Surfaces of Uterus.—The whole uterus is made up of two coats, which differ in their arrangement like parchment.[9] The outer is more fibrous and smooth and firm and white; the inner is more fleshy and villous and soft and red[10]—intertwined throughout with vessels, which are most numerous and noteworthy over the broadest part of the body,[11] where the

[1] *Vide antea.*

[2] Νευρώδης from νεῦρον, a sinew, nerve.

[3] It is difficult to understand Soranus' description here. It is only on the left side that the uterine veins open into the renal. We must, however, remember that fifteen centuries must elapse before the idea of filling the vessels with wax, so as to allow of their being dissected out, springs up in the fertile mind of Swammerdam (1672).

[4] Δίδυμος, literally *double*, then *twin*, then *testicle* or *ovary.*

[5] Παρ' ἑκάτερον πλευρὸν ἀνὰ εἰς. "Pleura" corresponds to the middle segment of the side of the uterus, *v. antea.*

[6] It is not clear what vessel is here referred to. From the fact that it enters the neck of the bladder, we might suppose it to be the ureter; but, as it is distinctly said that it enters the ovary and also runs down the side of the uterus, it is more probably the uterine artery.

[7] Soranus evidently missed the discovery of the tubes made by Fallopius fourteen centuries afterwards, and supposed that the ova were carried into the bladder and ejected.

[8] Perhaps the Fallopian tube is referred to here.

[9] Τῶν χαρτῶν.

[10] Soranus is here describing the wall of the uterus as seen on its two *surfaces*—the peritoneal and mucous-membrane; we must remember that he is not describing the coats of the uterus as in section—an altogether modern method. In preparing parchment, two layers of papyrus were woven together.

[11] Πυθμήν, the widest part of the body, *v. antea.*

seed becomes adherent and from which the menstrual discharge takes place.[1] Those two coats are kept together by softer and more fibrous bands; and, accordingly, when these are stretched, the uterus frequently falls down, the fibrous coat remaining in its place, the other one descending inverted.[2] Further, commonly in multiparæ, the uterus has folds running towards the body, usually two, and closely folded so as to be like felt; in those who have borne, the whole uterus is stretched out and becomes rounded.[3] Diocles[4] says that there are cotyledons[5] in the cavity of the uterus called πλεκτάναι[6] or κεραλαι,[7] which are nipple-like outgrowths, broad at the base, and narrowing to the top; that they lie on both sides, being devised by Nature for the sake of teaching the embryo to practise beforehand how to draw at the nipples of the breast.[8] But they make anatomy speak falsely, for the cotyledons are not found; and what they say about them is contrary to Nature, as has been proved in treatises on generation.

Sympathetic Relations of Uterus.—We must not suppose that the uterus is essential to life, for not only does it fall down, but in some it may be cut away without causing death,[9] as Themiso[10] has recorded, and they say that in Galatia pigs fatten after the uterus is cut out. Nevertheless, it affects sympathetically the stomach and membranes.[11] It has, moreover, a certain sympathetic relation to the mammæ: at all events, when it grows larger at puberty, the breasts also swell out simultaneously; and although it brings the seed[12] to perfection, yet the mammæ prepare milk for the nourishment of the offspring when born; and when the menses flow freely the milk dries up, while as long as the milk comes freely the discharge does not appear; so also in those past their prime, when the uterus grows smaller the mammæ likewise somehow waste away, and when the embryo is diseased their size is reduced—in fact when in the pregnant we see the breasts fall away and contract, we anticipate that there will be a miscarriage. So much for the nature of the uterus.

Vagina.—The Female Pudenda are also called κόλπος γυναικεῖος.[13] The wall is fibrous and somewhat rounded, like intestine, more roomy at its inner and narrower at its outer end; and in it sexual intercourse takes place. It is attached internally to the cervix uteri, externally to the labia, inferiorly to the breech, laterally to the fleshy parts of the acetabula, superiorly to the neck of the bladder—for this last, as we have said, extending beyond the os uteri and being placed close above the genitals, opens at its end

[1] This incidental reference to the menstrual discharge as coming from the body of the uterus is worthy of note.

[2] Soranus apparently thinks that in Inversion the whole wall is not inverted.

[3] Soranus is here apparently speaking of the two stems of the arbor vitæ; and does he here, like Küstner, refer to the arbor vitæ's being less marked in multiparæ than in nulliparæ? We note that he does not think it worth while to contradict the received view that the uterus consisted of several cavities; he contents himself with simply describing what he has seen.

[4] Diocles lived about the end of the 4th century B.C.

[5] This word means (1), *the suckers or the feelers of the polypus;* (2), hence the *feelers* themselves; also (3), in plural, *certain vessels at the mouth of the uterus* of some animals (Hippocrates).

[6] Literally, *feelers* of the polypus.

[7] Literally, *horns.*

[8] Soranus is evidently here poking fun at Diocles.

[9] Where is the recorder of recent statistics of extirpation of the uterus?

[10] Quoted elsewhere by Soranus, but I cannot find when he lived.

[11] Μήνιγγες—nervous system (?).

[12] *i.e.*, ovum or embryo.

[13] Here used, as will be evident from what follows, of the vagina. He goes on to describe the vaginal walls, etc.

into the urethra. Accordingly, it is evident that the vagina lies beneath the neck of the bladder, but upon the anus and the sphincter and the lowest part of the rectum. Its length, as we have mentioned above, varies not only with age, or with sexual intercourse, in which the cervix being elongated like the male organ takes up some part of the vagina; but also some have by nature a longer cervix, and others a very much shortened one. The length [of the vagina] is in most adults 4 inches. It is certainly closed and narrower in virgins, being furnished with folds held together by vessels taking their rise from the uterus; these cause pain in first sexual intercourse when the folds are opened out, for they are broken and discharge the blood usually seen. For the view is false that a thin partition-membrane has grown up, barricading the vagina; that this is broken, and causes pain at first sexual intercourse or sooner when menstruation sets in; and that, grown thicker, it produces the disease called atresia. For in the first place, it is not found in dissection; and in the second place, in virgins it ought to offer resistance to examination with a probe, for the probe penetrates deeply; in the third place, if the membrane was the cause of pain in intercourse, excessive pain must necessarily accompany the appearance of menstruation, and not be delayed till coitus.[1] Further, if the membrane's becoming thick caused atresia, we should find it in the same place constantly, in the same way in which we always see other parts each in its own place. But in cases of atresia, the obstructing membrane is found at one time near the labia, at others in the middle of the vagina,[2] at others at the os uteri. So much for the vagina.

External Genitals.—The parts seen outside are called *πτερυγώματα*,[3] forming, as it were, the lips of the vagina. They are thick, fleshy, and extending down beside each thigh, as it were, diverging from each other; above, they end in what we call *νύμφη*,[4] which is the beginning of the two labia. In Nature this fleshy prominence is muscular, and it is called "nymphē" through its being covered as brides are veiled.[5] Below the clitoris another fleshy prominence lies concealed, which belongs to the neck of the bladder; it is called the urethra. The rough portion forming a fold within is called *χεῖλος*.[6]

Bladder.—The Female Bladder differs from that of the male; for the former is larger, and has the neck curved, the latter is smaller with a straight neck.

The nature of the female organs having been described, we go on to the functions of the Uterus:—Menstruation, Conception, Pregnancy; and, after development of the fœtus, Parturition. Following the natural order, we shall speak first of Menstruation."

In reading this chapter no one can fail to be impressed with the scientific orderliness with which the subject is treated, the exclusion of matter adventitious to anatomy, and the dogged keeping to facts.

In the subject matter we note the following statements as of peculiar interest in relation to more modern work:—"When these

[1] Soranus here combats some view that the hymen was always imperforate, and hence had to be broken even when menstruation sets in.

[2] *Αἰδοῖον*—here used for the vagina.

[3] *i.e., wings*—the *labia majora.*

[4] Not what we now term the nymphæ (labia minora), but the clitoris, as is evident from his description of its relations.

[5] *Διὰ τὸ ταῖς νυμφευομέναις ὁμοίως ὑποστέλλειν τὸ σαρκίον.*

[6] *i.e., a lip*—the labium minus.

(the ligaments) are shortened by inflammation, it (the uterus) is dragged over and lies to the side." "It (the os externum) becomes open at certain times, as in the orgasm of coitus, to receive the semen, and during menstruation that the blood may escape." " . . . . the body of the uterus where the seed becomes adherent and from which the menstrual discharge takes place." "Further, and most commonly in nulliparæ, the uterus has folds running towards the body, usually two, and folded like felt." "But now in cases of atresia the obstructing membrane is found at one time near the labia, at others in the middle of the vagina, at others at the os uteri." The references to operations for hernia in which the ovaries were seen and to the extirpation of the uterus (apparently prolapsed) are of great interest.

As to style, it has that rather of the scientific teacher than of the investigator, and is therefore to be regarded, I think, as the finished product of anatomical investigation done by many hands, probably in the dissecting rooms at Alexandria. This only makes it the more remarkable, that Galen, whom we pass to next, either did not know or took no notice of the book, and the more to be regretted that all the work on which it was based was lost, and had to be done over again fourteen centuries later at the Revival of Learning.

Galen, who was born at Pergamos in Asia Minor in 130 A.D., lived under Hadrian, the Antonines, Commodus, and Severus. Although distinguished in human anatomy generally, he neglected altogether the anatomy of the female pelvis. In the section, Γαλήνου περὶ μήτρας ἀνατομὴς βίβλιον,[1] he begins as follows:—

> "We shall treat of the situation of the uterus, its size and form, whence it hangs, how it is nourished, to what it is attached, what it touches, what things surround it, and what things are produced in the womb during pregnancy round the chorion and membranes embracing the fœtus." He describes the uterus as extending above with its fundus to the umbilicus, below to eleven fingers'-breadths from the vulva, and reaching with its horns to either ilium. In describing its form also, he says that the shape of the fundus is like the bladder, but that it has mammary processes extending towards the ilia. Further on, he says that "in woman and in other animals which are like to women in the uterus, such as goats and cattle, ... fœtuses are found not in horns but in the rest of the whole cavity." "But these (as I think) mix up and suggest to the mind absurdities, since they cannot explain the use and action of the horns. And as my discourse would be too long and also unequal if I spoke of the use and action of the horns and not of the other structures round the uterus, on that account this subject is to be deferred to another treatise."

From the foregoing it will be evident that Galen had never opened a female pelvis, and it is remarkable that he should have sat down gravely to write an account of what he had never

[1] Tom. ii. of the complete edition of his works, comprising 20 volumes of the *Medicorum Græcorum Opera quæ exstant:* Editionem curavit D. Carolus Gottlob Kühn, Lipsiæ 1827.

seen. In a note on this book Kühn says, "humanos uteros non incidit, sed simiarum aliorumque animalium."

Aretæus is considered by Dr Francis Adams, the learned editor of a collection of his works for the Sydenham Society, to have been a contemporary of Galen. He infers this from the connexion between their literary and professional views, and that the only way of accounting for the remarkable fact that neither mentions the writings of the other is that they were contemporaries, and were prevented "by rivalry or the established usage of living authors" from referring to each other's work. Of Aretæus nothing is known except that he is called the Cappadocian, from which we may suppose that he was a native of that region of Asia Minor. He gives us a fair account of the ligaments of the uterus; and, speaking of prolapsus, he says:[1]—

> "The membranes which are inserted into the flanks, being the nervous (fibrous) supporters of the uterus, are relaxed; those of the fundus, which are inserted into the loins, are narrow [evidently, the round ligaments]; but those at its neck, on each side, of the flanks, are particularly nervous (fibrous) and broad, like the sails of a ship."

The mobility of the uterus must also have struck him: for he says in speaking of "hysterical suffocation"—

> "In the middle of the flanks of women lies the womb, a female viscus, closely resembling an animal; for it is moved of itself hither and thither in the flanks, also upwards in a direct line to below the cartilage of the thorax, and also obliquely to the right or to the left, either to the liver or spleen; it likewise is subject to prolapse downwards, and, in a word, it is altogether erratic."[2]

The following reference to what we now speak of as the decidua is of interest:—

> "It would appear that of the double membrane of the womb, the internal lining coat is sometimes torn from the contiguous one, for there are two transverse plates of the coat; this, then, is thrown off with a flux [menstruation?] and in abortion and laborious parturition, when it adheres to the placenta."[3]

Moschion.—The next contribution of Anatomy to Obstetrics is a book on "Diseases of Women," which has given rise to an extremely interesting critical inquiry as to its origin. Both a Greek and Latin version have come down to us, of which the former alone is in the College of Physicians' Library,[4] with a modern Latin translation by F. O. Dewez, published in Vienna in 1793. The book is in the form of a catechism, the first ten pages consisting of short questions:—"What is an obstetrician? By how many names is the uterus called? Where does the uterus lie? Of what nature is the uterus? How many coats has the

[1] The extant works of Aretæus the Cappadocian, edited and translated by Francis Adams, LL.D., for the Sydenham Society, London, 1856, p. 361.

[2] *Ibid.*, p. 285.

[3] *Ibid.*, p. 361.

[4] Μοσχίωνος περὶ τῶν γυναικείων παθῶν, Moschionis de mulierum passionibus liber. F. O. Dewez, Viennæ. Apud Rud. Gräffer et Soc., 1793.

uterus? Into what parts does the uterus fall? Where lies the os uteri? How far is it distant and backward? Of what nature is the os uteri? How large is it when closed? Where are the ovaries placed? Concerning the menstrual cleansing, why is it so called?" etc.

Putting aside the first question, answered in the first section of Soranus which we have not translated, those that follow take up the topics treated in his anatomical chapter and in the same order, with the exception that the vagina and external genitals are passed over. The questions that follow are based on the topics of the next section of Soranus which deals with menstruation; and the topics throughout are on the whole the same as his and in similar order. The form of the book is an instructive example of how systematic and thorough the teaching at that time must have been. It is a catechism with 152 questions and concise answers such as might easily be committed to memory; and it has this further interest, that it contains what was thought to be the earliest drawing of the human uterus.[1] In our illustrations we have reproduced this drawing.

From the foregoing it will be evident that this work of Moschion's is based on the teaching of Soranus, though when Moschion lived, and what the exact relation of the two books to each other is, lies wrapped in obscurity. Moschion admits in his preface that his book is not an original, but a translation from a Greek text for the use of "Latin matrons and obstetricians[2] unskilled in the Greek tongue." This original Latin Moschion is lost. The Greek version, which we have in the College of Physicians' Library, is considered by Weber (quoted by Ermerins) to have been produced in the sixth century at Constantinople;

[1] I here mention the generally received view, but when we come to speak of Vesalius we shall find evidence that this drawing is a modern interpolation. The letters in the diagram are in Latin, those in the text in Greek, which shows, I think, that the cut is not of the same date as the text. As far as the mere lettering goes, we might consider the cut to be the older, for Dewez says that Moschion's original work was written in Latin. "Moschion," he writes, "as is evident from the preface to my MS., wrote this book for the sake of Latin matrons and obstetricians as being ignorant of the Greek tongue; therefore he wrote in Latin, not in Greek. It is not unlikely that time has destroyed the Latin work, and only the Greek version written in very late Greek has come down to us."

The terms in Moschion's text are the same as those of Soranus, except that the neck and isthmus together make the χόριον not καυλός, πλεύρα becomes πλάγια, and πυθμήν becomes βάθος. I think also that Moschion transposes the last two: for Soranus everywhere uses βάσις for the parts between the Fallopian tubes corresponding to the base on which the cucurbita or cupping-glass stands, while Moschion applies it to the "cavity," to which the term is clearly inapplicable. This may also be the reason why the word πυθμήν has dropped out (meaning, as it does, "*the belly of a flask*") and is replaced by βάθος—"*the deepest place.*"

[2] "Obstetrician" is the Latin *obstetrix*, showing that the art was at this time practised by women.

and the extant Latin version is, according to the same authority, a still more recent reproduction of this Greek one.[1] Further, it is held by Weber and Ermerins that even the original Moschion is not based directly on Soranus, but on a work on Diseases of Women written in the fourth century by Cælius Aurelianus who in his turn drew from Soranus. If this view be correct, we must place Moschion somewhere during the fourth century, or between it and the sixth.[2] These various editions of Moschion show that the book was widely used, and hence that the valuable work of Soranus in Gynæcology and Obstetrics was during these centuries not altogether lost. We only hope that the students of obstetrics of those days read Moschion not Galen.

It is interesting to follow the history of this book through its various stages in the light of these different editions; and we would suggest that the first Latin version, for the use of Latin-speaking matrons and midwives, was produced before the fall of the Western Empire in the fifth century; its Greek sister just fits in with the development of the Eastern or Greek-speaking Empire at Constantinople in the sixth century; and the version in barbarous Latin points to a later period, when learning was beginning to make way again in Western Europe.

During the following centuries, Anatomy suffered the fate of all science in the lethargic sleep of the Dark Ages. It fared even worse than other sciences, because Islamism distinctly forbade both dissection and the representation of parts of the human body.

It was not till the beginning of the fourteenth century that it roused itself again, and that in Italy where the world's life was intensest. The intellectual energy of Italy was at that time concentrated in the University of Bologna. Of the Bolognese School of Medicine at this time, Sir William Turner in his learned History of Anatomy[3] writes—

"The University of *Bologna*, which, as a school of literature and law, was already celebrated in the twelfth century, became in the course of the following one not less distinguished for its medical teachers. Though the misgovernment of the municipal rulers of Bologna had disgusted both teachers and students, and given rise to the foundation of similar institutions in Padua and Naples, and though the School of Salerno, in the territory of the latter, was still in high repute, it appears, from the testimony of Sarte, that Medicine was in the highest esteem in Bologna, and that it

[1] "My (Weber's) own opinion is that the Latin fœtus was a product of the Schola Salernitana, to which we owe many translations of that kind."

[2] Dewez informs us that Gessnerus is wrong in making Moschion live in Nero's time, for the son of that Julia Agrippina whom Moschion says he cured of sterility had the cognomen of Diogenes which Nero had not.

[3] *Encyclopædia Britannica*, ninth ed., vol. i. p. 805.

was in such perfection as to require a division of its professors into physicians, surgeons, physicians for wounds, barber-surgeons, oculists, and even some others. Notwithstanding these indications of refinement, however, anatomy was manifestly cultivated rather as an appendage of surgery than a branch of medical science. . . . In this state matters appear to have proceeded with the Medical School of Bologna till the commencement of the fourteenth century, when the circumstance of possessing a teacher of originality enabled this University to be the agent of as great an improvement in medical science as she had already effected in jurisprudence. This era, indeed, is distinguished by the appearance of Mondino, under whose zealous cultivation the science first began to rise from the ashes in which it had been buried. This Father of Modern Anatomy, who taught in Bologna about the year 1315, quickly drew the curiosity of the medical profession by well-ordered demonstrations of the different parts of the human body. In 1315, he dissected and demonstrated the parts of the human body in two female subjects; and in the course of the following year he accomplished the same task on the person of a single female."

Though Mondino dissected three female bodies, he evidently did not examine the uterus, for in his *Text-book of Anatomy*, issued in 1316, he describes the uterus as containing seven cavities. This volume, as the first modern work based on dissection, gained such a position "that here and there in Italy it was decreed by law that anatomy should not be taught from any other book" (Haller). Mondino's text-book, with its defective and altogether erroneous description of female pelvic anatomy, was thus for the next two centuries the standard work in Italy. Soranus and Moschion lay buried and forgotten. It is for this reason that, although the revival of General Anatomy begins with Mondino, the revival of Obstetric Anatomy (which marks the commencement of our Third Period) does not date from him.

Towards the end of the fourteenth century a great impulse to the study of anatomy came from the students of Art. To Giotto's failures to represent hands and feet and the position of the limbs in different postures, we are more indebted for the revival of interest in anatomy than appears on the surface. The first anatomical drawings (for there are no illustrations in the works of Mondino), if not the first efforts to get at what lay below the skin, were by Leonardo da Vinci (1452–1518)—great in anatomy as in art. Not only have we his own anatomical drawings, but we read that he illustrated the anatomist Mark Antonio de la Torre's book for him.[1] Of Michael Angelo's work, Haller says,[2]—"Exact anatomical skill is seen in his drawings; nevertheless he

[1] Choulant's *Geschichte und Bibliographie der anatomischen Abbildung, etc.*, Leipzig, 1852, p. 6.

[2] *Op. cit.*, p. 164.

represented muscles more stiffly than is right. Twenty-two anatomical plates of his are mentioned, which he drew himself." Choulant[1] gives a plate of one of his drawings, in which, although the skin is not removed, the muscles come out very strongly; alongside of the figure is a scale giving the proportions of the different parts of the body. Raphael also left behind him several anatomical studies.

We thus find an intimate relationship established between anatomy and art, they rendering one another mutual assistance. Anatomy aids art by giving it what is below the skin—the significant in the anatomical substratum of a given posture or action. Art aids anatomy by giving it, according to Choulant, three forms of illustration: (*a*), the diagram; (*b*), the picture of an organ as an individual; (*c*), the representation of the type—the result of the study of many individuals, so as to get at the typical or normal, and eliminate the accidental or abnormal. This last is necessarily the result of many drawings of individual specimens, and represents what is common to all. This distinction made by Choulant is suggestive; for if we look at these three modes of representation comparatively we find that each has had its own place in history, and has now its own work to do. The first, or diagram, was earliest in history, for men could sketch in the general features of an organ before they knew it intimately (by "intimately" I mean in detail and exactly): its work nowadays is chiefly as an aid to expression in teaching—by a rough diagram one can often show what one means more quickly and more clearly than in words. The second, or drawing of the individual, came next—when a specimen of a given organ was first carefully studied and described: its work is in research, the gaining of new knowledge. The third, or drawing of the type, came last, when enough of specimens had been studied individually to allow of generalization: its work is in handing on what has been accumulated, *i.e.*, in teaching—in teaching only; it is of no use in research. The Diagram, the Picture of an Individual Organ, the Drawing of the Type—each does its own work as an aid to expression, research, teaching.

After this digression on these artist-anatomists and the service rendered by art to the study of anatomy, we return to the pure anatomists; and among them the name of Berengario da Carpi stands out, and with him we make our Third Period begin.

Third Period.

This period commences with the work of Berengario da Carpi at the beginning of the sixteenth century, and it embraces also that of Vesalius, of Eustachi, and of Fallopio,—all of whom belong to the same century.

[1] *Op. cit.*, p. 11.

As we have said, we make this period begin with *Berengario da Carpi*, "primus humanæ anatomie instaurator," as Haller calls him.[1] Rightly "*instaurator*" (re-storer), for he only brings obstetrical anatomy back to where Soranus left it. Son of a surgeon, he studied anatomy from a boy. He took his degree at Bologna, and, after teaching surgery for some time at Pavia, returned to his university town to fill the chair of surgery. The University of Bologna still retained its position as the first in Italy. As in Edinburgh now, the University was the pride of the town, which even adopted on its coins the University motto, "Bononia docet." As a school of painting, too, Bologna had become famous, especially through Francesco Francia, who did not die till 1517; so that, from the friendly relationship we have described between art and anatomy, we can well believe that Berengario, the professor of surgery, must often have met the distinguished artist and Master of the Mint. After leaving Bologna in 1527, Berengario lived for some time in Rome, where he became famous for treating syphilis by mercurial inunction, and made a large fortune, which he left to the Duke of Ferrari.[2]

Berengario did splendid work in Anatomy. He boasts of dissecting at least a hundred bodies. He was even accused of cutting them up alive, but his "*Anatomia vivorum*" refers to what a surgeon might see in the course of an operation. His first work was to publish (1521) a *Commentary on the Authorised Text-Book of Mondino*.[3] He gave the results of his own dissections in a separate treatise, the *Isagoge breves, etc.*,[4] which was published in the following year. Both of these works are noteworthy from two points of view:—(1), They are the first text-books of anatomy *with illustrations*—the first efforts after an exact representation according to nature. The quaint attitudes and rugged execution are against

[1] *Op. cit.*, tom. i. p. 167.

[2] We have the following quaint reference to him in Astruc:—"James Carpensis, as he was the only one who knew this secret medicine, viz., using unctions and quicksilver in curing the venereal disease, was rendered so rich by that alone, that he died attested of (left in his will) forty thousand crowns in silver, besides plate, all which he left to the Duke of Ferrari. For all the water, adds Fallopius, runs to the sea."—*A Treatise of Venereal Disease*, etc., by John Astruc. London, 1756. Book v. p. 155.

[3] "*Commentaria cum amplissimis additionibus super Anatomiam Mundini una cum textu ejusdem in pristinum et verum nitorem redacto.* Impressum Bononiæ per Hieronymum de Benedictis; pridie Nonas Martii. MDXXI."

[4] The College of Physicians' Library has not the 1522 edition, but this one of 1535, published at Venice (entered in the catalogue under the name *Berengarius Carpus*, as if it were the work of a different man from the author of the *Commentaria*):—"*Anatomia Carpi, Isagoge breves perlucide ac uberime, in Anatomiam humani corporis, a, cõmuni Medicorum Academia, usitatam, a, Carpo in Almo Bononiensi Gymnasio Ordinariam Chirurgiæ publicæ Docente, ad suorum Scholasticorum preces in lucẽ date.* Venetiis, Anno D. MCCCCXXXV." The title-page is adorned with a vigorous woodcut of Berengario at work among his pupils. On the last page of the book it is described as—"*Impressum Venetiis per Bernardinum de Vitalibus Venetum*, MDXXXV."

them. The attitudes, representing the subjects as if alive, are an introduction of art into anatomy which the purely scientific spirit resents. The ruggedness is due to defective means of reproduction, and an interesting paper might be written on the influence of methods of reproduction on anatomical drawing—the Wood, Copper, and Stone Ages. Still, the illustrations of Berengario are truly artistic productions. Choulant[1] says of him:—"Himself engaged in art, and associated with artists and the friends of art, he has kept the artistic standpoint in his works." (2), These two books are further noteworthy as *contributions to Obstetrics.* The only viscus which he considers worthy of reproduction is the uterus; and in making and publishing his section of it, he forever uprooted and cast out the erroneous teaching of Mondino. The plate represents a female figure standing with a veil behind her, which she holds over her head with the left hand. The abdomen is laid open; the uterus and cervix divided coronally. There is grim humour in representing the subject as holding in her right hand, for purposes of demonstration, the front half of the divided uterus and cervix. The description is as follows:—

> "You have in the belly of this figure the uterus laid open, in which you will see certain black points indicating the heads of the veins, which are called cotyledons. You have, further, the uterus laid open outside the body, on which rests the index finger. And in the fundus of the uterus you will see a certain depression indicating a right and left half; but I have not found in the uterus any other division. The black points are the cotyledons, and you will see that the cervix does not possess these."

This illustration with descriptive note appears in the *Commentaries,* and is repeated in the *Isagoge.* The *Isagoge* gives in addition a plate of the uterus (reproduced in our illustrations) seen from the outside and laid open, with this note:—

> "Because things repeated ten times are wont to please, you have here two uteri, of which the one is turned outside-in, where you will see how, through the whole cavity, there are many black points indicating round cotyledons, which are not present in the neck. In the other figure you will see the natural womb with its testicles and spermatic vessels, and the ligaments with which its horns are bound. You will see also the neck and the os through which menstrual blood and fœtus pass and the semen enters."

Passing from the work of Berengario we come to the three other great contributions in the sixteenth century made by anatomy to obstetrics—those of Vesalius, Eustachi, and Fallopio.

Vesalius (1514–1564), a doctor's son, a native of Brussels, studied arts at Louvain, and medicine at Montpeliers and Paris. He then returned to Louvain, where he began to teach anatomy, of which he became Professor at Padua in 1537, and his name thus

[1] *Op. cit.*, p. 8.

comes to be linked with those of Fallopio and Eustachi in the Italian School of Anatomy. He worked chiefly at human anatomy, and, according to Choulant, secured the services of the best artists of the day to reproduce his preparations. He is even said to have employed Titian, but as that artist was upwards of sixty years of age when Vesalius published his first plates, it is more probable that Titian deputed his pupil Stephen von Calcar to do the work. In 1538 he published his first six plates at Venice, and in 1543, when only twenty-nine years of age, his immortal work *De humani corporis fabrica libri septem.* Further, in 1546, in a letter *De radice chinæ epistola,* he criticised Galen's work, showing that that anatomist dissected not men but monkeys, and mixed up his conjectures from the dissection of animals with old descriptions—whence his mistakes as to the uterus and other organs. The College of Physicians' Library contains a 1555 edition of the seven books on Human Anatomy[1] and a 1564 edition of the plates.[2]

In the illustrations of the fifth book of his anatomy we have very fair representations of the uterus, cervix, and vagina—a great stride forward from the rude illustrations of Berengario. First, we see (Fig. 24) the abdomen laid open, all the intestines cut away except the rectum, and the mesentery and omentum drawn aside so as to show the position of the uterus and bladder seen through the brim. Fig. 25 is similar, only the peritoneum has been dissected off. In the description he says, "we have as far as possible deprived the uterus of the outer covering which the peritoneum affords to it, removing all the membranes as thoroughly as possible, that we may see the vessels which carry the material of the semen to the ovaries, and again the seed from them to the uterus." From the plate and this description it is evident that Vesalius did not understand the Fallopian tubes. Fig. 26 shows the uterus removed from the body and seen from below; while Figs. 27 and 28 are very good drawings of the uterus and vagina removed from the body, the uterus being divided coronally. We have reproduced this figure, as far as it shows the uterus, in our illustrations. In Figs. 28 and 29 we have the uterus of the dog and the cow. Fig. 30 shows a pregnant[3] uterus laid open, also the fœtus and membranes; Figs. 31 and 32 the ovum from the dog and the ox. In the edition of anatomical plates referred

[1] *Andreæ Vesalii* Bruxillensis, scholæ medicorum Pativinæ professoris, de Humani corporis fabrica, libri septem. Basileæ, ex officino Joannis Oporini, anno salutis per Christum partæ MDLV. mense Augusto.

[2] *Anatomes totius, œre insculpta delineatio, cui addita est epitome innumeris mendis repurgata, quam de corporis humani fabrica conscripsiit clariiss.* And. Vesalius, Paris, MDLXIIII.

[3] Is this from a human subject? Haller says in a foot-note (*Op. cit.*, tom. i. p. 182):—"Vesalius confesses that he had rarely cut into a gravid uterus (*Rad. Chin.*, p. 207) and had not yet dissected one when he was publishing his work."

to we have most of these figures reproduced in one plate, and in addition exactly the same drawing of the uterus as we have seen in Moschion's work, but with different letters and modern description. The mode of representing the ovaries and vessels resembles the other drawings of Vesalius; it shows the uterine artery which was not known to Moschion; all the other illustrations of Vesalius are apparently of his own dissections and no mention is made of this illustration as being borrowed from Moschion: for these reasons we think that the illustration in Moschion's work is a modern interpolation, which would deprive Moschion of the credit of being the first to give an illustration of the uterus.

Of the life of Vesalius, after publishing his immortal work, Haller says:—"The very fame of Vesalius spoiled his splendid work. Having become the first authority by his success in treatment, he spent the great part of his life after this at the court of Charles V. and Philip II. A most acceptable court-physician, but shut out from all anatomical work except sometimes the examination of men dying from some unusual disease. Hence he did not add to nor correct the new edition of his great work in 1555, as might have been expected from his zeal for anatomy." He died in 1564, on a pilgrimage to Jerusalem, the generally received reason for which journey Haller endorses: he had cut down on the heart of a man who had just died so as to feel it beating with his hand, and through the clemency of Philip II. was allowed to expiate this crime by a pilgrimage to Jerusalem; on his way home he was called to take the place of Fallopio at Padua, but was wrecked on his journey thither.

Eustachi (1500-1574).—The anatomical engravings of Bartolomeo Eustachi, or Eustachius as he is more commonly called, were, according to Sir Wm. Turner, completed in 1552 (nine years after the impression of the work of Vesalius), but were not published till nearly two centuries afterwards (1714) by Lancisi.[1] This book is in the College of Physicians' Library. There are two plates of the uterus—one showing the arrangement of the vessels, especially their relation to the round ligament. The descriptive notes to the plates are by Lancisi. The next plate shows the external genitals and the fundus as seen through the brim; the uterus and vagina removed from the body, seen from the outside and in coronal section; the human fœtus with its membranes (chorion and amnion) and the placenta lying separate.

With *Gabriel Fallopio,* or Fallopius as we usually call him (1523-1563), Haller[2] makes the Italian School of Anatomy begin,

[1] Tabulæ Anatomicæ Clarissimi viri Bartholomæi Eustachii quas è tenebris tandem vindicatas et sanctissimi domini Clementis xi. Pont. Max. munificentiâ dono acceptas præfatione notisque illustravit, ac ipso suæ Bibliothecæ dedicationis die publici juris fecit Jo. Mariz Lancisius. Rome, 1714.

[2] *Op. cit.*, tom. i. p. 218.

"which from the Revival of Learning during the following century was supreme, so that there were few anatomists who did not go out from it." In the course of a short life (he died at forty) he greatly enriched anatomy. Besides being unwearied in research, he was a blameless man, "unjust to no one, except, perhaps, Eustachius—a bitter man to whom none of his contemporaries were friendly."

His chief work was his Anatomical Observations published at Venice in 1561; the earliest edition of it in the College of Physicians' Library is in the complete works of Fallopius, published at Frankfort in 1600.[1] In these Observations[2] he devotes several paragraphs to the organs of generation in the female. After mentioning that the term cervix is often wrongly applied so as to include vagina, and that it should be limited to that part in which the os uteri is, he describes the clitoris as follows:—

> "It springs by a double origin, one from each bone of the pubis, and in both the aforesaid origins it has plainly muscular tissue, though little for the size of the structure. There are vessels running along the dorsum just as in the male member, and it ends in a certain extremity which looks like the glans, being contained in a sort of skin like the prepuce, which skin unites those two structures of the external genitals which are called by the Greeks, especially Soranus, Pterygomata. All this part of the pudenda as it is small and hidden in the more fatty part of the pubis has thus escaped the notice of anatomists, and so escaped it that I have been the first to lay bare the same in recent years."

Of the hymen he says:—

> "There is another structure to be noted in this sinus in women, which anatomists sometimes find and laugh at those who place a membrane there. But to my mind they are not thus to be laughed at." And he goes on to describe it as a membrane not entire, "but perforated in the middle by a hole of such a size that in adults the point of the little finger can easily enter." He refers to Soranus's difficulty with regard to it, and says: "For the satisfaction of that great man let me say that the membrane does not seem to me very firm, and is perforated like a ring."

Of the uterus he writes:—[3]

> "I now come to the uterus, in which, if I explain my view openly, I doubt not that you will smile, since I am about to say things which not only contradict the accounts of the ancients and moderns, but also overturn completely certain teachings, or at least make them totter. Nevertheless, I shall not desist nor fear the quiet smile of a learned man, since I shall recount what I have seen again and again with my own eyes, and also showed openly to others."

[1] Gabrielis Falloppii Mutinensis Physici ac Chirurgi præclarissimi in felicissimo Gymnasio Patavino olim rem Anatomicam et Chirurgicam admirabili cum laude profitentis; Opera omnia, in unum congesta et in medicinæ studiosorum gratiam excusa, etc.: Francofurti apud hæredes Andreæ Wecheli, MDC.

[2] *Opera Omnia*, p. 420.

[3] *Op. cit.*, p. 421.

He then describes the round ligaments:—

"They are not muscular, although they appear somewhat red and fleshy, but are twin fibrous processes springing from the sides of the uterus, and sometimes filled up with a fleshy cord so that they look red. Ascending to the inguinal region and perforating the peritoneum just as the seminal vessels do in the male, they pass out through the opening of the tendon of the descending oblique muscles; . . . . and when outside the abdomen, they turn slightly towards the pubis, and there end through being lost in the fat."

Of the ovaries, he says:—

"All anatomists assert with one voice that semen is made in the female testes, and that they are found full of semen, which I could never see although I gave no small labour that I might learn this. I have seen in them indeed some vesicles as it were turgid sometimes with water or a watery fluid, sometimes yellowish, sometimes limpid; but I have never seen semen except in the spermatic vessels themselves or those called 'excretory.' They affirm also that those spermatic vessels spring from the ovaries, and are united completely to them, and end in the so-called horns of the uterus, which is not at all the case, since I could never see those seminal tubes united to the testes unless the uterus was pathological."

After commenting on this, he thus describes the tubes, with which his name has ever since been associated:—

"That slender and narrow seminal duct rises, fibrous and pale, from the horn of the uterus itself; becomes, when it has gone a little bit away, appreciably broader, and curls like a branch (capreolus) until it comes near the end, then losing the horn-like curl, and becoming very broad, has a distinct extremity which appears fibrous and fleshy through its red colour, and its end is torn and ragged like the fringe of well-worn garments,[1] and it has a wide orifice which lies always closed through the ends of the fringe falling together; and, if these be carefully separated and opened out, they resemble the orifice of a brass trumpet. Wherefore since the seminal duct from its beginning to its end has a likeness to the bent parts (capreoli) of this classic instrument, separate or attached, therefore it has been called by me the *Uteri Tuba*. These are present not only in the human bodies, but also in the sheep, cows, and all other animals which I have dissected."

He further describes[2] the blood supply to the uterus, showing that there are two sources on either side—what we now speak of as the ovarian and uterine arteries—and that there is an anastomosis not only between these vessels on the same side, but between those of opposite sides. It is noteworthy that Fallopius made out this anastomosis before the injection of vessels was used as an aid to dissection.

"The spermatic arteries and veins (although anatomists may affirm that, as in man, they mingle before they come to the ovaries) are sometimes carried without uniting[3] beyond the ovaries, and thus go so plainly to the uterus itself and the seminal duct [Fallopian tube], which most of them surround, that they can be recognised by every one; for there belongs

[1] Extremumque lacerum valde et attritum est veluti sunt pannorum attritorum fimbriæ.

[2] *Op. cit.*, p. 422.

[3] "Sejunctæ aliquot ultra testem feruntur."

to the uterus a double set of arteries and veins—the one the seminal [ovarian], coming down from above ; the other those which spring from the sides of the vessels of the sacrum. The latter, they say, are spread over the sinus, or (to use their term) cervix ; the former over the uterus itself or fundus. But it should be known that these upper vessels, before they are all spread out, anastomose in the uterus with some from below, and thus united enter the part of the fundus near the cervix or the sinus [vagina] itself ; also that, although now and then they go to join other vessels,[1] some branches from those lower vessels pass upwards to supply the fundus, which, as soon as they enter the substance of the uterus, anastomose, or are united with the aforesaid vessels from above. Thus there is always present a continual anastomosis, either outside the uterus or immediately beneath the peritoneum which covers the uterus, or in the substance of the latter. I think that this anastomosis has been neglected by anatomists, because during pregnancy the very copious supply of blood brought by the seminal vessels (as is evident in some pregnant persons) may be discharged into the vagina through these lower veins, whereas otherwise the monthly discharge is got rid of directly through the fundus uteri. I could not be laughed at by anatomists were I to say that in the substance of the uterus itself some twigs of those vessels of the right and left side are so united that the vessels become one. I do not say all of them, but some ; and therefore that there is a community between the vessels on the right and left, and that nutriment is carried to the fœtus by both kinds of vessels, although the umbilical ramifications [in the placenta] throw their roots into one side of the uterus only."

In the next paragraph he touches on the anatomy of the pregnant uterus,—

"One thing, finally, I have observed in all the women whom I have dissected who died either during or immediately after or before labour, that the piece of flesh which is called by me placenta always occupies or sticks to one of the two portions of the uterus in which ends the opening of the seminal duct (Fallopian tube) ; and this also I have noted, that this opening is, as it were, the centre of the whole space occupied by the placenta.

"In those parts which belong to the fœtus I have some points in which I differ from the rest of anatomists,—(1st), This, which I said when I was treating of the umbilical arteries, that without doubt the arteries which are carried with the umbilical vein and urachus to the fœtus are alway double in nature,[2] though often there is one only, which, as it is formed of the two large arteries of the chorion joined, also divides into two before entering the umbilicus, so as to pass to the arteries of the sacrum ; (2nd), That the fleshy cake which coalesces with the uterus for the sake of the security of the vessels is never to be considered among the membranes of the fœtus.

"Although some say that Galen called it chorion, this is false; for Galen knew it well, not, indeed, in man, but in other animals, and calls it 'flesh concreted round the mouths of the vessels,' but not chorion."

It is worthy of note that Fallopius here speaks of having dissected cadavera from women in labour and post-partum, but the passages quoted are all that he tells us of the anatomy of the pregnant uterus. In the next paragraph he says that Hippocrates called this concretion (placenta) "cotyledons," which leads him

[1] In conjuncta inferantur—lit., are borne into joined vessels.
[2] Nempe perpetuo geminas esse arterias.

into an excursus[1] on the history and use of that term. He shows that Diocles, quoted by Soranus, held them to be mammæ; Praxagoras and Galen to be crater-like eminences at the mouths of vessels; while Aristotle described them as little cups (κοτύλοι, used by Homer for "cups"), convex towards the uterine wall, with nutritive material heaped up in them (like a phlegmon producing a tubercle), which exudes into the fœtus.

> "Therefore the cups (or cotyledons) are those things of which Aristotle spoke, and truly they are not found in the human or canine uterus as anatomy teaches, but only in that of horned animals and of those mentioned by Aristotle; . . . and only in pregnancy."

At the conclusion of this argument he points out the error of Hippocrates with a grace and dignity, as well as a desire to put the best construction on what another had taught, worthy of imitation:

> "This being settled, what shall we say if Hippocrates mentions 'cups'? May the Manes of so great a man spare me, a man who was the presiding deity of the medical art, when I say that he spoke the truth in words that deceived! For if any one would doubt (my opinion) that crude or cold humours or even mucus contained in the uterus are the cause of abortion, he would walk blind in daylight; but that these humours are contained in cotyledons is false, because there are no cotyledons. In the mouths of vessels these humours may be contained, but being there they would by no means cause abortion."

Fallopius made another contribution to Obstetrics in his description of the bones of the fœtus in the *Expositio de Ossibus*—in Haller's quaint language, "Ossa enim fœtūm primus inter mortales contemplatus est."

These four men—Berengarius, Vesalius, Eustachi, and Fallopio—made the chief contributions of anatomy to obstetrics during the sixteenth century; and with that century our study of the "early contributions" should end. Important their contributions were—so important that on the first superficial glance over the field it seems as if the harvest were reaped, and little left to be gathered in. Dr John Barclay, the Extra-Academical Lecturer on Anatomy in Edinburgh at the beginning of this century, has thus wittily compared the work done by these men with that of those who followed them:—

> "Gentlemen, while carrying on your work in the dissecting-room, beware of making anatomical discoveries; and, above all, beware of rushing with them into print. Our precursors have left us little to discover. You may perhaps fall in with a trifling supernumerary muscle or tendon, a slight deviation or extra branchlet of an artery, or perhaps a minute stray twig of a nerve,—that will be all. But beware! Publish the fact, and ten chances to one you will have it shown that you have been forestalled long ago. Anatomy may be likened to a harvest field. First come the reapers, who, entering upon untrodden ground, cut down great store of corn from all sides of them. These are the earliest anatomists of modern Europe, such as Vesalius, Fallopius, Malpighi, and Harvey. Then come the

[1] *Op. cit.*, pp. 422–424.

> gleaners, who gather up ears enough from the bare ridges to make a few loaves of bread. Such were the anatomists of last century—Valsalva, Contunnius, Haller, Winslow, Vicq d'Azyr, Camper, Hunter, and the two Monros. Last of all come the geese, who still contrive to pick up a few grains scattered here and there among the stubble, and waddle home in the evening, poor things, cackling with joy because of their success. Gentlemen, we are the geese."[1]

Dr Barclay's humorous statement does not hold true of the anatomy of obstetrics, for while the contributions hitherto made by anatomy to obstetrics deal principally with the anatomy of the uterus before pregnancy, a little consideration will show us that the field of the anatomy of pregnancy and labour was before the eighteenth century unreaped.

To throw a bridge over the gap between the "early contributions" and the work of more recent date, we shall just touch upon one or two names familiar to us in obstetrical anatomy, and thus join the old with the new. In the seventeenth century we have two names—*Malpighius* (1628 to 1694), and *Graafius* (1641 to 1673). Malpighi was Professor of Anatomy at Messina and Bologna, and published in 1681 his monograph, *De Utero Epistola*, in which he describes the mucous glands in the uterus of the calf, the muscular fibre of the wall, and the corpora lutea of the ovary. *R. de Graaf*, whose name has become immortal in the Graafian follicle, published at Leyden in 1672 his *De Mulierum Organis Generationi inservientibus;* and shortly before his premature death, his *Partium Genitalium Defensio.* In the former of these he describes—in the human female—the uterine vessels and those of the fœtus, the corpus luteum, and the mucous glands of the uterus.

In the eighteenth century, most of the names group themselves round the illustrious *Haller* (1708-1777), and we cannot refrain from quoting from a bit of autobiography he gives us[2] in his work to which we so often have had occasion to refer. "I may be allowed here to review my life—that part which belongs to anatomy. Knowing too well how unequal I was to the great task I undertook of building up physiology from the foundation, I shall show, if I do not mistake, that I made some efforts to get nearer the truth." After dissecting animals at Tübingen under Duvernoi, who used dogs when human bodies failed, he went a mere boy to Leyden to attend Boerhaave's lectures. "I heard Boerhaave's lectures," he writes, "with incredible pleasure."

> "That incomparable man gave his teaching so honestly, clearly, and fully, that while he might have equals in matter, he had none in the art of teaching. I worked alongside of Albinus with no small reward, imitating on the opposite side of the body what this distinguished man was demonstrating to his industrious students on the other. . . . . I often went to the excellent old man Ruysch, frequently with commissions from Boerhaave. There was in him the greatest zeal, patient work in in-

[1] *The Story of the University of Edinburgh*, by Sir Alex. Grant, Bart. London: Longmans, Green, & Co.: 1884. Vol. ii. p. 390.

[2] *Op. cit.*, tom. ii. p. 195.

jection, and he was very skilful in preserving bodies. In 1727, I went to England, and became acquainted with James Douglas, from whom I might have derived much greater benefit—for the great man allowed me to share in the work which he was carrying on diligently in completing the description of the bones. I saw, and with no small admiration, his great wealth of skeletons and bones—some lying with their ligaments in salt water, others cut in every direction with a saw. But the great rush of people from the whole of Europe for the inauguration of the new king—that prince to whose munificence I owe much, George the Second—drove me to Paris. There I heard Le Dranium as a guest, and dissected with him. I confess (may the good old man forgive me) that I was disappointed at the paltriness of what was called the theatre, and by the too rapid dissection which could not investigate anything very carefully. Further, when I saw Winslow tracing out the most minute parts of the human structure, I was not satisfied until, along with a surgeon de la Garde, I got at my own expense secretly a supply of dug-up dead bodies in which I might examine the nerves and vessels of the heart, the muscles of the hand, and other things, more carefully and with something of the detail of Winslow. But the spiteful curiosity of a labourer overturned this opportunity of learning; for having dug under the wall to see what I was doing, he reported my name to the guardians of public safety. To escape heavy penalty, perhaps the galleys, I had to hide, and have the bodies removed."

After other appointments, we find him settled at Göttingen. Of his work there he says:—

"I had only to build an anatomical theatre and procure a supply of bodies. I arranged that the bodies of criminals should be brought to me from all parts to be dissected, that those of the illegitimate should also be handed over, and thus I got an ample supply of cadavera, especially of children. It was thus easy for me to prosecute with greater zeal the anatomy of the arteries, which at that age could be better demonstrated than the muscles, and had been incompletely, even erroneously described, for the beautiful injections of the Belgians were directed rather to the intricate arrangement of the minuter vessels than to the more general distribution called popularly "Angiologia."

Haller had the faculty not only of continuous labour himself, but also of setting others to work; and if we owe a great deal to him, we owe much also to his students.

"Further, another idea very fortunately occurred to me. When I saw numerous eager young students flocking to the new academy and seeking the highest honours, I advised each to take up for himself some difficult point of anatomy or physiological question, to which he might devote himself for two winters. There were plenty of cadavers at their command; I helped the studies of the young fellows as much as I could, and made many investigations (*experimenta*) on different animals—in fact, an incredible number. Accordingly, as several of the young men were simultaneously devoting their leisure, which was greater than mine, each to a single part of our noble art, much more progress was made than any industry of mine alone could have effected. To this day it gives me the greatest satisfaction to turn to the exquisite descriptions of the nerves by Meckel, Anderschen, and others, that careful study of the sheep which Kuhlemann undertook, and the admirable anatomical preparations of some of the rest of the young men. Nor has light failed to shine from this Institution upon Physiology.

"But as human affairs are imperfect, I, who had been called from clinical practice to anatomy, was compelled to lay aside such inquiries;

being driven from lecture-room and chair by failing health, loss of sleep, and a weakness of the right hand which threatened paralysis. I had to sacrifice honours, rewards, and the hope of learning and achievement dearer than all these, to the preservation of life and health. Labours of a very different kind were awaiting me in my native land, which those coming after me will hardly believe to have been imposed upon me, unless they be familiar with the genius of free republics.

"Nevertheless from the hours claimed by my country, I snatched some for myself. As opportunity offered I measured carefully the motion of the blood, investigated the form of the bones and the rest of the fœtus, dissected pregnant animals, studied the anatomy of brain and eyes, and worked also at pathology; I thus kept up in some degree my practice in anatomy."

He speaks thus regretfully of having to give up his time to public affairs:—

"I have always praised the good fortune of Albinus, and should almost have envied it if that loftiest of men had not used so well the great opportunity he had. This distinguished man gave more than fifty years to a single art, drawn aside by no other duties; he was able to forego all honours for the perfecting of his subject."

The latter part of his life was given to legal and political work, and he writes thus sorrowfully of his having to give up his favourite studies for public duty:—

"My lot drove me to the different departments of law, to a laborious magistracy, to the care of the Republic, to difficult negotiations with neighbouring states and kings, and to various other duties. Therefore let a generous posterity pardon me if I have not done more than I was able for, have left here and there some things incomplete, and have been compelled to take some things from others since I could not have observed everything myself. Let them, I pray, take the will for the deed."

To almost all of those whose names are mentioned in this interesting bit of autobiography, Obstetrics is indebted for some anatomical contribution. *Albinus*, with whom Haller dissected in Paris, has given us seven plates of the gravid uterus, published at Leyden in 1747.[1] The plates are drawn full-size, and are beautiful as works of art, but they lack the accurate anatomical detail which characterizes Hunter's work. "The excellent old man *Ruysch*," a native of the Hague and professor at Amsterdam, is known to us as the author of the "*Tractatus de musculo in fundo uteri observato, antea a nemine detecto;*" in this he describes the muscular fibre of the fundus uteri as forming a *detrusor placentæ*. The *James Douglas*, whose wealth of skeletons and

[1] *B. S. Albini Tabulæ septem uteri mulieris gravidæ cum jam parturiret mortuæ.* Lugduni Batavorum, MDCCXLVIII. In the College of Physicians' Library we have these bound up with his magnificent plates of the bones and muscles. Plate I. is an outline of the figure of the uterus; Plate II., one-half of the uterine wall removed, showing the ovum in the cavity; Plate III., one-half of the membranes in addition removed to show the fœtus; Plate IV., fœtus removed, showing placenta attached to the uterine wall; Plate V., uterus and placenta removed from body; Plate VI., the complete ovum; Plate VII., uterine cavity with ovum removed, showing placental site. An appendix shows the attitude of the fœtus in utero.

bones excited Haller's admiration, is better known to us as the describer of the peritoneum round the uterus, and especially of the pouch which bears his name.[1]

To the idea which fortunately occurred to Haller of advising his students to take up an anatomical point, and work at it for a graduation thesis, obstetrics is greatly indebted. Volume V. of his Selected Theses on anatomical subjects is devoted to the Organs of Generation.[2] In it we find, amongst others, his own dissertation on the "Oblique Situation of the Uterus, and the Seminal Vessels;" Naboth's essay on "Sterility in Women," which survives in the name of the Nabothian follicles of the cervix; also Vater's essay on the "Gravid Uterus," giving a drawing of a six-months' pregnant uterus—one of the very early representations of the Gravid Uterus.

To Edinburgh men it will be of interest to know that amongst Haller's students was *Donald Monro*, son of Alexander (Monro primus), the Professor of Anatomy in our University. He read before an Edinburgh society a paper[3] on the maternal and fœtal vessels in the placenta, showing by injection that there is no communication between them. His father had read before the same Society an elaborate essay on the "Nutrition of Fœtuses;" and in the same volume we have two essays on the Anatomy of the Pregnant Uterus, from his younger brother Alexander Monro, "student of medicine in the University of Edinburgh."

Another of Haller's pupils was the distinguished anatomist and obstetrician *Rœderer*, whose seven plates[4] of the gravid uterus are less diagrammatic than those of Albinus, the drawings of cervix and ovary being especially good. Along with the plates of Albinus and Rœderer we must mention those of another famous man, although his name is not connected with that of Haller. In 1754 *Smellie* published in London his beautiful series of plates, which

[1] A Description of the Peritoneum and of that part of the Membrana Cellularis which lies on its outside, with an account of the true situation of all the Abdominal Viscera. London, 1730.

[2] *Disputationum Anatomicarum Selectarum. Vol. V. Organa generationis, Collegit edidit præfatus est Albertus de Haller.* Gottingæ apud Viduam Abram Vandenhœck, Acad. Typogr. MDCCL.

[3] The Dissection of a Woman with Child; and Remarks on Gravid Uteri: By Dr Donald Monro, Physician at London. Article 17 in *Essays and Observations, Physical and Literary*, vol. i. p. 403. Edinburgh, 1754.

[4] *Icones uteri humani observationibus illustratæ.* Gottingæ sumptibus Vandenhœckianis, MDCCLVII. Plate I. represents a parturient uterus seen from the outside; Plate II., same uterus laid open to show fœtus and placenta in their natural position; Plate III., same with fœtus removed to show placenta; Plate IV., gravid uterus at the sixth month, seen from the outside and with vessels injected; Plate V., fœtus and placenta in natural position; Plate VI., internal surface of same gravid uterus as V., showing filamentous tunic of secundines, openings of tube and of cervix into uterus, and cervical canal laid open; Plate VII. shows internal surface of the cervix, virgin uterus from outside and in coronal section, ovary of virgin, Graafian vesicles, ovary of pregnant woman, and various corpora lutea.

are so well known to English obstetricians that I need say nothing about them. Our reason for mentioning Smellie's name here is that we regard the work of Albinus, Rœderer, and Smellie as together forming the first considerable contribution to the anatomy of the uterus in pregnancy in contrast to that of the non-pregnant organ, which had up to that time monopolized attention. This subject was during the eighteenth century systematically worked out, and attained its greatest development in the hands of William Hunter.

By this brief survey of the work of the seventeenth and eighteenth centuries we have sought to bridge over the gap between the "Early Contributions of Anatomy to Obstetrics" and the work of Hunter, which we have dealt with in a former paper[1] —his immortal contribution, "The Description of the Gravid Uterus."

The President had listened with interest and pleasure to this paper, which exhibited evidence of much research on Dr Barbour's part. He asked whether the Arabian physicians, such as Avicenna, had not made any contribution to the anatomy of obstetrics, as they had not been referred to in the paper.

Professor Simpson agreed with the President as to the value and interest of the paper. He drew attention to the predominance of Scotch names in the last group of Dr Barbour's list, and thought it more than creditable that Scotland had contributed so much to this subject. It seemed also of interest to observe how much one had simply borrowed from another, and it was of importance that the true source of some of the descriptions should have been traced. There could hardly be any doubt that the drawing of the uterus generally attributed to Moschion was really the work of Vesalius.

Dr Milne Murray showed a perfect copy of the first edition of Deventer's book on Midwifery (1701). The later editions were quite common, but the first was comparatively rare. He drew attention to the vigour and general accuracy of the drawings, which were numerous and artistic.

IV. REPORT OF THE ROYAL MATERNITY AND SIMPSON MEMORIAL HOSPITAL FOR THE QUARTER ENDING 31ST JANUARY 1888.

By CHRISTOPHER MARTIN, M.B., C.M., and JOHN G. HAVELOCK, M.B., C.M., Resident Surgeons.

INTERN CASES.

DURING the quarter 80 women were delivered in the Hospital, the largest number yet delivered during any quarter. 14 of these

[1] "Sectional Anatomy of Labour," *Transactions of the Edinburgh Obstetrical Society*, 1886-1887, and *Edinburgh Medical Journal*, 1887.

patients were married. 45 were i.-paræ; 27 were ii.-paræ; 2 were iii.-paræ; 2 were iv.-paræ; 2 were v.-paræ; 1 was vii.-para; and 1 was a ix.-para.

Age.—(*a.*) Primiparæ: average age, 22 years 10 months; youngest, 17 years; oldest, 36 years. (*b.*) Multiparæ: average age, 25 years 8 months; youngest, 19 years; oldest, 37 years.

Duration of Labour.—(*a.*) Primiparæ; average duration of 1st stage, 19 hours 34 minutes; 2nd stage, 2 hours 18 minutes; 3rd stage, 28 minutes; whole labour, 22 hours 20 minutes. (*b.*) Multiparæ: average duration of 1st stage, 10 hours 16 minutes; 2nd stage, 1 hour 9 minutes; 3rd stage, 25 minutes; whole labour, 11 hours 50 minutes.

Presentations and Positions.

(*a.*) *Primiparæ.*—I. Longitudinal. (1.) Cephalic: vertex, O.L.A. 33, O.D.P. 10, head transverse in a case of rickety pelvis 1; face, 0. (2.) Pelvic: breech, S.D.P, 1. II. Transverse, 0. Total, 45.

(*b.*) *Multiparæ.*—I. Longitudinal. (1.) Cephalic: face, 0; vertex, O.L.A. 27, O.D.P. 5, uncertain 1. (2.) Pelvic: breech, S.D.P. 1, S.L.A. 1. II. Transverse: shoulder, Sc.D.A. 1. Total, 36.

Sex and Weight of Children.—(*a.*) Primiparæ gave birth to 23 males and 22 females. Average male weighed 6 lbs. 13 oz.; heaviest, 9 lbs. 4 oz. Average female weighed 6 lbs. 3 oz.; heaviest, 8 lbs. 10 oz. (*b.*) Multiparæ gave birth to 19 males and 15 females. The average male weighed 7 lbs. 1 oz.; heaviest, 9 lbs. The average female weighing 6 lbs. 13 oz.; heaviest, 8 lbs. 12 oz.

Length of Children.—The average male measured 19½ inches; longest, 21½ inches. The average female measured 18⅝ inches; longest, 21 inches.

Placenta.—Average weight, 1 lb. 6 oz.; heaviest, 2 lbs. 7 oz.

Cord.—Average length, 22½ inches; shortest, 12 inches; longest, 37 inches. Insertion in 1 case, velamentous; in 2 cases, marginal; in 4 cases, central; in 74 cases, excentric. In 1 case the cord was twice round the body; in 4 cases, once round the neck; in 1 case, twice round neck; and in 1 case, four times round the neck.

Cauls.—3 children were born with cauls.

Peculiarities of Children.—In 1 case the soft palate was cleft. In 1 case there was a well-marked spina bifida in the lower dorsal region, the child having also extreme double talipes varus and slight hydrocephalus. In 2 cases the hymen was hypertrophied. In the first case it was prolonged into a solid elongated body tapering to a point, and measuring about ½ inch long by ⅛ inch in diameter. In the second case it projected from between the labia majora as a fan-like body, its edge being connected with the vestibule by a free band.

Classification of Labours.—Natural, 50; laborious, 22 (lingering 11, instrumental 11); preternatural, 4; complex, 3; abortion, 1.

Natural Labours.—In 7 cases the second stage was precipitate. In 1 case there was hydramnios; 4 were premature.

Laborious.—There were 11 lingering and 11 instrumental labours. Forceps (axis-traction) were applied in 5 cases for exhaustion in the second stage and threatening inertia; in 3 cases for persistent occipito-posterior position; in 1 case for large size of head; in 1 case for rigid perineum in an elderly primipara; in 1 case for rickety pelvis which came in too late for turning.

Preternatural Labours.—There was 1 transverse presentation, second pregnancy, at the eighth month, Sc.D.A. position. Professor Simpson turned. The child was still-born.

There were 3 pelvic presentations. 1 was S.L.A.; 2 were S.D.P. In one case the child was putrid; in the other cases the child was born alive.

Complex Labours.—There was 1 case of twins; patient near full time; both vertex O.L.A.; both females, and alive; one placenta, two bags of membranes.

There was 1 case of eclampsia. There was 1 case of placenta prævia with acute pneumonia. (These two cases detailed further on.)

Abortion.—One case at the sixth month; second pregnancy. Patient was delivered almost immediately she entered the Hospital, the fœtus being expelled as she walked into the delivery-room. She had no signs of syphilis, but the placenta was fatty.

The case of placenta prævia was at the sixth month.

There was 1 case of threatened abortion successfully warded off. The patient left Hospital undelivered.

Premature Labours.—Two at the seventh month and putrid; 1 case at the seventh month lived 1 hour 40 minutes; 1 case at the seventh month lived 10 hours in the incubator; 1 case at the eighth month reared successfully in the incubator.

Adherent Membranes.—In 2 there was total adhesion, and in 4 cases partial adhesion, of the membranes, necessitating in all cases the introduction of the hand into the uterus. There was no case of adherent placenta.

Torn Perineum occurred in 10 cases. In 5 the tear was trifling, involving chiefly the vaginal mucous membrane. In 4 it was more severe; whilst in 1 case the laceration extended back to, but not through, the sphincter ani. Silk-worm gut sutures were used for the skin surfaces and catgut for the mucous membrane. Union was perfect in all cases except one, in which catgut was used for the skin surface instead of silk-worm gut.

Cocaine Pessaries were employed towards the end of the quarter during the 1st and 2nd stages. They seemed to have little or no influence in relieving the pain of the dilatation of the cervix, but appeared to alleviate the patient's sufferings towards the end of the 2nd stage by anæsthetizing the perineum.

Ophthalmia neonatorum occurred in 5 cases at the beginning of the quarter; but no further cases appeared after Credé's 2% solution of nitrate of silver was used as a prophylactic.

Puerperium.—In 3 cases phlebitis of the saphena vein occurred. All did well. There was no phlegmasia.

In 1 case a brilliant scarlatiniform rash appeared on the third day of the puerperium and lasted three days. The patient had no peculiarity in the lochia and no other bad symptoms.

In 4 cases the lochial discharge became offensive, and in 3 of these slight febrile symptoms developed. In all cases the uterus was washed out with corrosive sublimate solution 1-4000, and all made a rapid recovery.

In 1 case a patient was admitted suffering from acute tonsillitis and inflammation of the middle ear. Perforation of the drum occurred. Patient, in addition, had broncho-pneumonia, and for several days was in great danger. She ultimately made a good recovery.

There was no case of puerperal fever.

Mortality.—(1.) Maternal, 2. One from eclampsia. One from placenta prævia and acute pneumonia.

(2.) Fœtal, 4. One in the case of eclampsia. One in the transverse presentation which was turned. Two premature and putrid, one being a breech case.

(3.) Infantile, 3. One died on the second day; its skin was studded with purpuric spots, and the spleen was found ruptured; the mother was syphilitic. One premature lived 1 hour 40 minutes. One premature lived 10 hours in the incubator.

The following cases call for special mention:—

I.—*Case of Eclampsia.*

M. S., single, primipara, 19; full time. Had scarlet fever when 8 years old. Was healthy till the early months of pregnancy, when commenced headaches, pain in stomach, and œdema of face and feet. On 20th November, about 11 A.M., had a severe eclamptic seizure, followed by coma; had then three fits in rapid succession. Was seen by a doctor, and removed in a cab to the Hospital. On admission, was semi-comatose; had œdema of face and feet; urine loaded with albumen and tube casts; was in first stage of labour; os was size of a crown piece. Chloroform was administered, when there was indication of the onset of a fit; 1½ minims of croton oil were given; mustard was applied over the loins; patient placed in hot pack; cervix dilated with Barnes' bags; forceps applied, and a dead child extracted about 5 P.M. No post-partum hæmorrhage.

Puerperium.—Was semicomatose after labour. Temperature, 101°·4. Three hours after delivery, had a severe convulsion; chloral administered; was semicomatose during the night; and, as the bowels had not moved, 1 minim of croton oil was given.

21st November, 10 A.M.—Was put on digitalis and iron; was conscious and much better. Temperature, 100°; pulse, 120;

copious watery motions. In evening, temperature rose to 101°·2; very restless and excited. Chloral was repeated.

22*nd November*, 8 A.M.—Patient quite comatose. Temperature, 103°; pulse, 130, very feeble; breathing rapid and noisy; pupils contracted; lochia sweet. Uterus washed out with weak antiseptic solution. Patient remained in this state all day, and at 8 P.M. uterus was again washed out. At midnight the temperature was 104°; pulse, 130, feeble. Antifebrin, 10 grains, given, and rapidly brought down the temperature to 101°·6 at 1.30 A.M. (23*rd November*), and at 9 A.M. the temperature was 99°·4; pulse, 114. At 4 P.M., patient semicomatose, very thirsty, very restless, breathing very rapidly (uræmic dyspnœa); pulse, 130; temperature, 100°·8; pupils contracted; pulse very weak. Hot pack and stimulants given very freely. Copious watery motions.

8 P.M.—During last twelve hours only 6 ounces of urine excreted, highly concentrated, loaded with albumen and tube casts; rapid, stertorous breathing; contracted pupils; rapid, feeble, irregular pulse. Temperature, 101°·2; semicomatose, which condition deepened into total coma.

9.45 P.M.—Patient died.

Summary of Dr Bruce's Report of the Post-mortem Examination.—Hypostatic congestion of lungs. Kidneys enlarged, congested, and studded with fatty points (in the second stage of Bright's disease). Cervix torn on both sides; pelvic organs otherwise healthy. Brain and cord healthy. No signs of septicæmia. Cause of death, uræmia.

II.—*Case of Placenta Prævia with Acute Pneumonia.*

Mrs C. M., aged 33, v.-para, had symptoms during pregnancy suggestive of commencing phthisis. Had one abortion at the sixth month, and three full-time labours. Patient was at the sixth month of pregnancy. On 8th December got wet through, had a severe rigor, followed by fever, flushed face, rapid breathing, and pain in left side. On 10th December, at 4 A.M., she got out of bed, when suddenly profuse flooding came on, with pains in the back and abdomen. She was put to bed, and the bleeding ceased to recur from time to time. About noon a doctor was called in, and found she had placenta prævia (central). He separated the placenta from the lower uterine segment and plugged the vagina. She was brought in a cab to the Hospital about 4 P.M.

On admission she was in a state of collapse, but not bleeding. The plug was removed, and a Barnes' bag introduced into the cervix, the os being about the size of a crown piece. Pulse rapid and thready. Stimulants were given; and about 5.30 P.M. Dr Hart performed bipolar podalic version, and brought one leg through a hole in the placenta. Ergot and stimulants were given. The child was born at 7.15 P.M., the placenta fifteen minutes later.

The patient lost no blood after she entered the Hospital, the uterus after delivery contracting firmly.

Puerperium.—Patient rallied fairly well. Next morning, about 9 A.M., had an attack of syncope. Temperature normal. In the evening (of 11th December) the temperature was 102°; pulse, 130; respiration, 36; pain in left side; cough, viscid sputum. On examination, the signs of consolidation of the lower lobe of the left lung were found. Mustard was applied, and stimulants given.

12*th December.*—Signs and symptoms of pleurisy of the right side developed; counter irritants applied. During the day the temperature remained about 100°·5; pulse, 130; respirations, 44, not difficult. Towards midnight the breathing became more difficult, till she had complete orthopnœa; pulse rapid and feeble; fœtid diarrhœa. Brandy and champagne given freely.

13*th December.*—In the morning: temperature, 100°; pulse, 140; respirations, 45. In the evening: temperature rose to 103°·6; pulse, 150; respirations, 54. Antifebrin, 10 grains, given, with stimulants freely. Towards midnight breathing became easier.

14*th December.*— Patient better. Temperature had fallen. Throughout the day the breathing continued to be easier. The temperature rose, however, to 102°·6; pulse, 150, very feeble; and respirations, 56. In the evening there was great orthopnœa. Stimulants, as before, very freely given.

15*th December*, 4 A.M.—Temperature, 101°; pulse, 150, very feeble; complete orthopnœa. Stimulants per rectum. Patient's condition gradually became worse; pulse more and more feeble; breathing more and more difficult. Temperature was 101°·5 shortly before death, which took place at 11.30 A.M. (on the eighth day of the pneumonia and the 6th day of the puerperium).

Summary of Dr Bruce's Report of the Post-mortem Examination.—Very anæmic. Old pleuritic adhesions on both sides of chest, also recent pleurisy. Left lung in state of gray hepatization throughout, except a small portion at apex, which contained air. Right lung œdematous and congested. The pneumonia was not a septic pneumonia. Right side of heart distended with clotted blood. Slight recent perihepatitis. Cloudy swelling of kidneys. Pelvic organs healthy. There were no signs of septicæmia. Cause of death—heart failure, due to (*a*), loss of blood from placenta prævia; (*b*), acute lobar pneumonia.

Extern Cases.

During the quarter 181 extern cases were reported. Of these 40 were primiparæ, 141 were multiparæ.

Classification of Labours.—Natural, 147; laborious, 14 (instrumental 10, lingering 4); preternatural, 6; complex, 8; abortions, 6.

Presentations.—Cephalic: vertex, 175; face, 1. Pelvic: breech, 6; doubtful, 3.

Positions.—Vertex cases: occipito-læva-anterior (O.L.A.), 155; occipito-dextra-posterior (O.D.P.), 18; occipito-dextra-anterior (O.D.A.), 2. Face case: mento-læva-anterior (M.L.A.), 1. Breech cases: sacro-læva-anterior (S.L.A.), 5. Doubtful, 1.

Details.

Instrumental Labours.—Forceps were used in 10 cases—in 3 for uterine inertia, in 4 for persistent occipito-posterior position, in 1 O.D.P. case where the head was jammed in a transverse position, once for rigid perineum, and once for scoliotic pelvis with contracted outlet.

Lingering Labours.—One was a face case; the others were due to rigidity of the cervix.

Preternatural.—All breech cases. In 2 cases the child was premature and still-born.

Complex.—Twins, 3; twins and P.P. hæmorrhage, 1; eclampsia, 2; prolapsus funis, 1; accidental hæmorrhage, 1.

In one twin case the first child presented by the breech, and was still-born; the second presented by the vertex, and survived.

In another twin case forceps were applied to the head of the first child; ergot was then given, and the second was born naturally.

In the case of prolapsus funis the head lay in O.D.P. position, and as the cord could not be replaced, and was slowly pulsating, forceps were applied, but the child was still-born.

(The remaining complex cases are described in detail below.)

Abortions.—Two at the third month, 3 at fifth month, 1 at the sixth month. In 1 case at the third month the fœtus had been born eight hours before medical aid was called in, but the placenta and membranes were still in utero. As the cervix only admitted the tip of one finger it was dilated digitally under chloroform, the whole of the secundines were removed, and the uterus washed out with hot corrosive sublimate solution. Patient made a rapid recovery.

Delay in the Third Stage occurred in 15 cases. In 5 cases it was necessary to introduce the hand into the uterus to detach and remove an adherent placenta, and in 3 cases to remove adherent membranes.

Sex of Children.—Males, 104; females, 81.

Peculiarities.—The largest child weighed 11½ lbs.; and was 27 inches in length; it was delivered naturally. A still-born premature child had a rudimentary forearm and palm on the left side with only two fingers. In one case the omphalo-mesenteric vessels were persistent, and could be seen coursing from the umbilicus down the cord to the remains of the umbilical vesicle—a small yellow shotty nodule situated on the fœtal surface of the

placenta, just beneath the amnion, near the margin of the placenta.

Mortality.—Maternal, 5 (2 from eclampsia; 1 from pulmonary embolism, 1 from accidental hæmorrhage, and 1 from post-partum hæmorrhage). In 3 of these cases assistance was not sent for to the Hospital till the patient was moribund. Fœtal, 8; 6 occurred in complex labours; 2 were premature and syphilitic.

The following cases demand special description:—

I.—*Case of Femoral Venous Thrombosis followed by Pulmonary Embolism.*

A. M., single, æt. 17, i.-para; a small delicate girl at the full time. Membranes ruptured early; first stage lasted 40 hours; during second stage patient was much exhausted; forceps were applied, and a living female child extracted. Patient rallied well, but on the third day the pulse was found to be 150, and temp. 99°·6, and there was a fœtid discharge from a tender uterus. The uterus was washed out with 1–4000 corrosive sublimate; next day the pulse had fallen and the discharge was sweet. On the sixth day patient complained of shooting pains in the left leg, and extreme tenderness in Scarpa's triangle. The femoral vein was found swollen, hard, and tender; pulse rapid and feeble, but the temperature never rose above 100°. No rigors, no vomiting, no peritonitic symptoms, but there was pain on left side of pelvis. This condition continued until the eleventh day, when as the student was palpating the thrombosed vein, the patient was suddenly seized with great dyspnœa, and became collapsed. Stimulants were given freely, but death took place in 45 minutes. A post-mortem examination could not be obtained, but it is probable that a clot had been detached from the femoral vein, and caused death by pulmonary embolism.

II.—*Case of Accidental Hæmorrhage at Eighth Month.*

Mrs C., æt. 36, v.-para; had a severe flooding after first child, and 10 months ago had serious hæmorrhage after an abortion; since then she has been very anæmic. On 21st January, about 8 P.M., she was in a crowded street, when she suddenly felt very faint, and had to be taken home. She was put to bed, vomiting, and complaining of pain in left side of abdomen, and it was then noticed that blood was escaping from the vagina. During the night there was hæmorrhage at intervals; about 4 A.M. she had a severe rigor, and stimulants were given. At 5.30 A.M. the house surgeon was sent for, and found her almost collapsed, extremely anæmic, and restless, complaining of severe pain in left side of uterus. Blood was escaping from the vagina, and the uterus was found to be very tense, and P.V. the os about the size of a crown-

piece, the cervix thick and rigid, the membranes unbroken, and the head presenting. The placenta could not be felt. Stimulants were given and the patient anæsthetized. Dr Hart, who had been called, then ruptured the membranes, dilated the cervix, and effected delivery with the forceps as rapidly as possible. The placenta came away immediately afterwards, and with it about 2 lbs. of blood-clot. Hæmorrhage was checked by the hot douche and ergotine; stimulants were again given, and the patient rallied somewhat, but died in the course of an hour apparently from loss of blood and shock. The child was still-born.

III.—*Case of Twins followed by Post-Partum Hæmorrhage; Death next day from Syncope.*

Mrs C., æt. 42, xiv.-para; about full time, went into labour on 2nd January, and was delivered of the first child alone, being found by a friend on the floor. She was put to bed, and the second child followed in an hour. The student on arriving about an hour later found the placenta not yet born, and that she had lost much blood and was still bleeding freely. The uterus was compressed, ergot administered, and hot douches given, but the bleeding still went on. The house-surgeon saw her three hours after the birth of the second child, then almost moribund, intensely pale, restless, the pulse almost imperceptible, the placenta still in utero, and the uterus large and full of clots. Stimulants and ergotine were given hypodermically, and the placenta at once detached and removed by the hand. Hot antiseptic uterine douche given. All hæmorrhage at once ceased, and the uterus contracted firmly. The patient rallied well, but next day, during the temporary absence of her nurse, sat up in bed, made some sudden exertion, and fell back in a state of syncope, dying 19 hours after delivery.

IV.—*Case of Eclampsia at the Eighth Month; Recovery.*

Mrs F., æt. 30, iii.-para. Previous labours normal. When about three months pregnant she had scarlet fever followed by dropsy, headaches, and gastralgia. Early in the morning of 4th November she became very excited and almost maniacal. At 6 A.M. had a severe eclamptic convulsion followed by deep coma. Fits recurred about every hour. At noon the house-surgeon found her comatose; face and feet œdematous, with copious albuminuria. Pulse was strong, and there was no œdema of the lungs. She was put into a hot pack, two minims of croton oil given, and $\frac{1}{8}$ gr. of pilocarpin hypodermically, producing copious watery motions and very profuse perspiration. The coma passed off in about three hours, and she again became very excited. Chloral and bromide of potassium, of each 20 grs., were given, and she became quieter. In the evening she was quite conscious and

sensible, and there was no recurrence of the fits. Next morning she was greatly improved, there was much less œdema, and the albumen was not so copious. Her bowels were kept open with pulv. jalap co., a diuretic mixture was given, and she was put on milk diet, with the result that a month later she was delivered of a living child, the labour quite natural and puerperium normal.

V.—*Case of Eclampsia.*

J. H., single, æt. 17, i.-para; a full time. Had diphtheria and measles when 2 years old, followed by dropsy, and has since then been delicate. For the last few months has had severe headaches and violent sickness, and has been very excitable and given to outbursts of passion. On evening of 2nd January was very excited; pains commenced at 2 A.M. 3rd January, and at 3 A.M. she had the first fit, after which she never recovered consciousness. At 6.30 she had another fit, and a student was called in. At 7 A.M. had fit, and at 7.15 and 7.45, and at 8.10 and 8.40 A.M. At 9 A.M. the house-surgeon found her comatose, in 2nd stage of labour, pains weak and irregular, head in pelvis and not advancing, with œdema of face and feet; urine bloody and loaded with albumen; pulse, 140 and soft. Two minims of croton oil were given. At 9.30 severe convulsion. Forceps were applied at 9.40, and the child born at 10 A.M. There was a slight tear of perineum and some post-partum hæmorrhage. Child was male, mature, and still-born. Patient was put in a hot pack, and 3j. of ether injected. At 12.45 P.M. had a severe convulsion, for which chloroform was given. At 1.20 the temp. was 104°, and at 1.50, 104°·8; pulse rapid and feeble. Ether was again injected, and 10 grs. of antifebrin given in brandy. At 2.30 P.M. chloral was given; respirations were 54. At 3 P.M. temp. was 105°·2; respirations, 64, stertorous; pulse, 142 and very weak. At 3.15 P.M., 1½ ♏ of croton oil given, as previous dose had not acted. At 4 P.M. temp. was 107°, and patient deeply comatose; respirations, 62, stertorous; pulse, 146. Antifebrin 10 grs. were given. Patient died at 4.30 P.M., six and a half hours after delivery.

VI.—*Case of Eclampsia; Turning; Death.*

Mrs B., æt. 42, xiv.-para; eight months pregnant. Previous labours normal. During last few weeks has had œdema of face and feet, headaches, and incessant vomiting. On 13th January at 11 P.M., whilst in the street became very giddy and went home. About midnight had a convulsion, became comatose, never again recovering consciousness. The fits recurred at intervals of 1 to 2 hours throughout the whole of 14th January. At midnight her friends sent to the Hospital, and the house-surgeon half an hour later found her comatose, eight months pregnant, the os about size of a crown-piece, the cervix thick but not rigid, and the head

presenting. Pulse slow, of high tension; face cyanotic; pupils contracted; conjunctiva insensitive. Urine was concentrated, smoky, and loaded with albumen. A few minutes after his arrival she had a violent convulsion. Croton oil 2 ♏ were given, and she was put in a hot pack. Dr Hart saw her at 1.30 A.M., and advised to have her delivered as soon as possible. A little later she had well-marked Cheyne-Stokes respiration. The cervix was dilated with Barnes' bags, and int. podalic version performed. The child was premature, dead, and delivered at 4.40 A.M. The placenta followed in fifteen minutes; post-partum hæmorrhage trifling. The croton oil was repeated, and she was put into a hot pack, digitalis fomentations were applied to the loins, and ether injected. This caused profuse perspiration. She, however, remained comatose, and died at 10.30 A.M., 15th January. A post-mortem could not be obtained.

MEETING VIII.—MAY 30, 1888.

DR BERRY HART, *Vice-President, in the Chair.*

I. *Dr Halliday Croom* showed—(*a.*) A MULTILOCULAR OVARIAN CYST which he had removed from a patient, who died on the day following the operation from fatty degeneration of the heart. (*b.*) DISEASED UTERINE APPENDAGES removed for severe dysmenorrhœa.

II. TWELVE CASES OF LAPAROTOMY FOR DISEASE OF THE UTERINE APPENDAGES.

By N. T. BREWIS, M.B., F.R.C.P.E., Physician for Diseases of Women, New Town Dispensary; Lecturer on Diseases of Women; Secretary Edinburgh Obstetrical Society; formerly Assistant to the late Physician for Diseases of Women, Royal Infirmary.

MR PRESIDENT AND GENTLEMEN.—It is now acknowledged that removal of the uterine appendages for disease is justifiable in properly selected cases. To make the selection is not difficult. The history of suffering, usually of some years' standing, directed specially to a certain locality, originating, perhaps, in an inflammatory attack of some part of the pelvis, either connected or not with parturition, to which sterility may perhaps be added, is of much value in helping us to make our selection.

In no class of cases is the history of more importance than in those under consideration, but in no case from the history alone are we justified in recommending operation. Physical signs are as important, but not more so than the history. By signs we can usually recognise a diseased condition to account for the history,

though in some cases they may be negative. Diseased conditions may exist which it is impossible to feel by the bimanual method of examination, *e.g.*, an ovary may be diseased, and yet not be enlarged or altered in shape or specially tender to the touch, or again the diseased structures may communicate no sense of resistance to the finger. By physical examination, also, we have to make sure that the uterus is not the cause of the symptoms, *e.g.*, it is necessary to ascertain that sterility, which is such an important factor, is not due to disease of the uterus which, if found healthy, may be excluded, and then usually the uterine appendages may be blamed.

In most cases it is difficult, and in many it is impossible to make out, by physical examination, the exact diseased condition of the appendages, but we are generally able to say that disease exists, which when taken along with the history is enough to justify us in recommending operative interference. Here let me say, that the best method of examination is the abdomino-rectal bimanual one. When the patient is anæsthetized, and the bladder and the rectum are empty, the examiner with two fingers of one hand in the rectum and the other hand on the abdomen is able to explore the pelvis thoroughly.

With you rests the responsibility of advising that an operation should be done; with the patient rests the responsibility of having the operation. It is only in exceptional cases, viz., those in which there is danger to life, as when we suspect pyosalpinx, that a patient should be urged to undergo the operation. I generally adopt the following plan with those who consult me. When I make up my mind that an operation is necessary, I tell the patient that such is my opinion, but that I will first try all means short of an operation before resorting to it. After a few months of palliative treatment, if the patient does not find her condition improved, she decides to undergo the operation, asks to have it performed, and thus rids you of the responsibility and necessity of urging it. In my experience patients who are anxious for the operation recover well. With regard to palliative treatment, every now and then we meet with a patient who by it gets rid of her symptoms, and becomes so much improved that an operation becomes unnecessary. On that account alone I think it should always be tried in the first instance. Occasionally you will meet with patients who are desirous of having their appendages removed without sufficient cause, but they are exceptional, and in such cases, of course, you must not allow their pleading to overrule your judgment.

The operative details of this operation are so well known to you that I will not go into them at any length, but will simply say, that I have followed Lawson Tait's teaching with one exception, viz., that I have used antiseptics in the form of carbolic lotion for sponges and instruments. When I am sure that the same

certainty of cleanliness can be obtained without as with antiseptics, then I will discard them.

I will say little about the pathology of the structures removed, as it is my intention to discuss this subject in a future paper.

The following cases are in consecutive order, and are all that I have operated on for this class of diseases. The first three were performed in working men's houses where the sanitary risks were considerable; the remainder, with one exception, were done in St Kessog's Home, under more favourable circumstances. The cases are narrated for the purpose of adding to the statistics of the operation, and on account of the interest which is individually attached to every case of abdominal section.

CASE I.—*Salpingitis; Prolapse of Ovaries.*

Mrs W., æt. 26, married five years, had one child, now 4 years old. When 12 years of age the patient had a severe attack of scarlet fever; she menstruated for the first time at 13. Her first menstruation was painful, and ever since each successive period has been so. During the last four years the pain has been intermenstrual as well as menstrual, in fact it has been constant. She was unfitted for her household duties, as the slightest exertion caused great pain in the right side and in the back; she could not assume the erect posture, but either sat or crawled about in a state of emprosthotonus; sexual intercourse had been discontinued for two years on account of the pain which the act evoked. Defæcation was also painful. On examination the right ovary was found somewhat prolapsed and excessively tender. The right thickened Fallopian tube was easily felt. The left ovary was lying prolapsed in Douglas's pouch, and was also very tender when touched.

I knew from the beginning that nothing short of removal of the appendages would cure her, but in the first place, I tried every other means of alleviating her distress that I could think of. I kept her in bed for six months, and treated her with the hot douche, glycerine plugs, blisters, tonics, anodynes, etc., but without doing her a bit of good. She then begged of me to have the operation performed, which I did in February 1886. No difficulty was experienced at the operation, and her recovery from it was uninterrupted. Both tubes were greatly thickened and dilated. The broad ligaments were much congested and were studded over with small cysts. The mucous membrane of the tubes was thickened and inflamed, and covered with a copious cheesy-looking material. The inflammation also involved to a very considerable extent the muscular tissue.

There was no history of gonorrhœa or puerperal inflammation in this case, and there seems nothing to account for the diseased condition but the scarlet fever from which the patient suffered at the commencement of puberty.

The patient is now in good health, and is almost free from pain.

CASE II.—*Cystic Degeneration of the Ovaries.*

Mrs F., æt. 30, has had five children, the youngest one year ago. Has been married nine years, and during the whole of that time has suffered from severe pain in the right side, which latterly has increased in severity. I examined her in April 1886, and found the uterus to be large; the sound passed 3½ inches; there was well-marked ectropion and granular erosion of the lips; the right ovary was felt lying in Douglas's pouch, tender, movable, and slightly enlarged. The left was felt in normal position, tender to the touch. The hot douche was ordered, and in the meantime the advisability of having Tait's operation performed, which had been previously recommended to her by the late Dr Angus Macdonald, was to be considered.

Two months afterwards Mrs F. returned and expressed herself as anxious to have the operation performed, which I accordingly did on 19th June. She made a most excellent recovery. On the night of the operation she passed flatus, on the following day she complained of very little pain, and at night she slept for about seven hours without waking and without a hypnotic. The highest temperature registered was 99°·6. The pulse ranged from 58 to 66 per minute. The ovaries were characteristic of cystic degeneration. The tubes were healthy.

The patient has been free of pain ever since the operation, and is now in excellent health.

CASE III.—*Papillomatous Cyst of the Right Ovary.*

Mrs C., æt. 33. Had one child, now 3 years old. Complains of pain in the back and both groins, of menorrhagia and of weakness.

Her illness dates from the birth of her child. I saw her for the first time in the summer of 1885, when she came to me complaining chiefly of menorrhagia. The uterus then was deeply placed, the sound passed 3½ inches, and at the right side of the uterus a cyst, the size of a child's head, could be felt running obliquely upwards. I curetted the uterus at this time, and relieved her of the menorrhagia. A year afterwards she sent for me to see if I could do anything for her side which still pained her, and rendered her unable to perform her household duties. The before-mentioned cyst was apparently unchanged in size and position. Neither ovary could be felt. I proposed abdominal section, to which she readily assented. On opening the abdomen the cyst was found to be monolocular, and to contain about two pints of dark yellow fluid. The pedicle was a broad one, and was secured in a Staffordshire knot. The right ovary was found diseased, and was also removed. Her recovery was easy and satisfactory. The highest temperature reached was 101°, which was evidently due to

flatulent distension, as with the introduction of a hollow glass tube into the rectum and the escape of flatus the temperature fell.

In the interior of the cyst was a papillomatous projection covering an area the size of a half-crown piece. The cyst wall in places was very thin, and had its removal not been effected, rupture probably would have taken place before long, and fatal infection of the peritoneum would have ensued. Tapping would have brought on a similar fatal result. The patient is now entirely free from pain.

CASE IV.—*Cystic Degeneration of the Ovaries; Chronic Salpingitis.*

Mrs D., æt. 37, married seventeen years, has had five children, no miscarriages. The youngest child is 9 years old. Ever since the birth of her last child the patient has suffered from severe pain in her right side. For a year she has also had acute pain in her left side, during which time she has been undergoing palliative treatment without any result. She expressed herself as being tired of life, and was only too pleased to run the risk of an operation for the chance of getting the pain removed. The right ovary was felt to be prolapsed. The left was in natural position, fixed, and very tender. On 12th December 1886 I removed the appendages, and had little difficulty in the operation with the exception of some adhesions which fixed the left ovary.

The ovaries were studded with dilated follicles. The tubes were chronically thickened, and had their distal ends closed by inflammatory membranes. The following is a note made when the patient visited me two months ago, *i.e.*, sixteen months after the operation.

The patient has been quite free of pain since the operation, and has been able to perform her duties. Previous to the operation she thought that life was not worth living, she has now changed her opinion. She has not menstruated since the operation. Sexual desire has been absent since. All that remains of the abdominal wound is a scar, scarcely visible, one inch long. The uterus is in good position, the body is slightly drawn to the left side. The right broad ligament is shortened. On the left side the stump of the pedicle is easily felt, not at all tender.

CASE V.—*Cirrhosis of both Ovaries.*

Mrs T., æt. 32, a thin, frail, underfed, highly nervous woman, the mother of three children, the youngest of whom is 3 years old, came to me in December 1886, complaining of pain in her back and sides, which had existed since the birth of her last child. She had inflammation after the birth of each of her last two children. For two years the pain had incapacitated her for work. Physical examination at this time was as follows:—

P. V.—The right ovary is not felt; there is some shortening of the right broad ligament. A tender cystic swelling is felt in the left retro-lateral pouch, probably an enlarged ovary. Per rectum an

irregularly round shaped body is to be felt external to the right utero-sacral ligament. The enlarged ovary on the left is also felt.

On 1st Sept. 1887.—No ovary was to be felt on the right side. Per rectum a small tender body was felt in Douglas's pouch. I mention those examinations made at different times, as they have a bearing on some remarks which I will make further on with regard to changes in physical signs.

Being a widow with three children I hesitated in advising operation, and tried palliative treatment for one year, but as there was no improvement, and as she from her complaint was unable to earn a living, at her request I consented to operate. The operation took place in September 1887; the patient made a good though somewhat protracted recovery, and was dismissed on 20th October greatly improved in health, and free from her old pain. The ovaries were small and hard, while the tubes were thickened and congested, but not blocked up.

CASE VI.—*Double Hydrosalpinx; Follicular Apoplexy of Right Ovary; Cystic Degeneration of Left Ovary.*

Mrs D., æt. 33, has had seven children, the youngest of whom was born seven years ago. Patient's last labour was brought on by a fall, which rendered her unconscious. On recovering consciousness, she found that she had been delivered of a six months' child, which was stillborn. During the two years which followed her confinement the discharge at the periods was excessive; subsequently the discharge diminished in quantity, but the periods became painful. The pain at first was limited to the periods, and was felt chiefly in the right side, but during the last year it has been constant both in the back and sides, and has rendered her unable to work. For years she has had leucorrhœa.

Physical Examination.—Pain is complained of when the lower abdomen is pressed on. *P. V.*—Vaginal portion of cervix is greatly enlarged and indurated, is deeply split, the lips are everted, and there is a large abrasion on the posterior lip. The uterus is retroposed. The right ovary is felt in normal position slightly enlarged and cystic. The left ovary is in Douglas's pouch, is tender and apparently cystic.

Diagnosis.—Cystic degeneration of ovaries. Laparotomy was performed on 20th August 1887. Dr Haig Ferguson kindly administered ether. The abdominal wall was thick, fat, and vascular. The right ovary was with some difficulty brought through the wound, and was followed by a large dilated tube. The pedicle was thick. The left Fallopian tube was similar to the right, but was more difficult to remove owing to adhesions and the deep position of the ovary.

The right ovary was slightly enlarged, and its interior on being cut into was found to be studded with cysts filled with a thick red granular substance. The distal end of the tube was firmly

agglutinated to the surface of the ovary. From the surface of the left ovary a thin-walled monolocular cyst, the size of a walnut, protruded containing a clear watery fluid. The rest of the ovary presented a natural appearance. The left tube was fixed to the ovary in the same way as the right. The patient made an easy recovery. She is now in excellent health, and has been entirely free of pain ever since the operation.

CASE VII.—*Myoma of Right Ovary; Chronic Salpingitis.*

Mrs G., æt. 37, has had seven children and three miscarriages. The youngest child was born six years ago. The miscarriages took place previous to the birth of the last child. In 1885 the patient was in the Infirmary suffering from perimetritis, and ever since she has had continuous pain, particularly felt in the left side but also present in the right side and back. The pain is always present except when patient is in bed. Menstruation has been very irregular.

Physical Examination, 3rd October 1887. — The uterus is slightly enlarged and only partially movable. On the right of the uterus, and close to it, a round very tender body, the size of a pigeon's egg, only slightly movable, is felt. On the left side high up a hard undefinable mass is indistinctly felt. Laparotomy was performed on 4th October 1887. The abdominal wall was very thick, the thickness being chiefly made up of fat. The muscles were very thin, and the peritoneal cavity was easily entered. The right ovary, considerably enlarged and of hard consistence, was felt deep down firmly adherent to the bottom of the right lateral retro-uterine pouch, with the greatly thickened Fallopian tube curling over it. Owing to the deep position of the ovary and the thick abdominal walls the wound had to be enlarged in order to allow the fingers to reach the ovary, which was carefully gouged out by separating the adhesions with the forefinger. The ovary and outer half of the Fallopian tube were brought to the surface, tied in a Staffordshire knot, and separated. A number of cut vessels as large as goose quills were seen in the cut surface of the pedicle, some of which were ligatured.

The left ovary was smaller than the right, was not so deeply placed, but was more firmly adherent, the adhesions binding it to the pelvic wall, the left lateral pouch, and the omentum. Both Fallopian tubes were very thick, fleshy, vascular, and friable, especially the left. The right ovary was enlarged and entirely myomatous. The patient recovered well, and is now quite free from her old symptoms.

CASE VIII.—*Chronic Ovaritis; Posterior Fixation of Uterus; Pneumonia following Operation.*

Mrs M., æt. 33, married sixteen years, had three children, the youngest ten years ago. Her last labour was a very difficult one,

and ever since she had had down-bearing pain in her back, and severe pain in both sides. She also complains of menorrhagia and painful micturition. She is very anæmic, and is quite unable to work.

Physical Examination.—The uterus is enlarged, deeply placed, and fixed. Nothing is felt in the right broad ligament. In the left an indistinct thickening is felt, causing pain when palpated. *Per rectum*, a round tender body, the size of a pigeon's egg, is felt high up to the left of the uterus.

Laparotomy was performed on 22nd October 1887. The left ovary was found to be enlarged, and lying in a bed of adhesions at the side and close to the uterus. The adhesions formed a roof across the upper part of the pelvis, and in their midst the ovary lay firmly imbedded. The shorter adhesions were broken up with the finger, so as to allow of the ovary being brought to the surface, when the longer adhesions were ligatured and divided. The right ovary and broad ligament were now searched for, but were nowhere to be found. The uterus was firmly adherent to the back wall of the pelvis by short, thick, very firm adhesions. These were partially separated by the finger in order to free the uterus, and also in the hope of finding the right ovary. In the latter respect, however, we were unsuccessful, and had unwillingly to stitch up the abdominal wound, with only one ovary removed.

The day after the operation the patient's pulse quickened; the night following she was restless, and frequently vomited. At 12.30 next day I saw her and found her pulse to be 124, temperature normal, respirations 40 per minute. On examining the abdomen it was found to be free from all tenderness, with the wound looking well. On auscultating the chest sonorous râles were heard at the end of inspiration, but no dulness was present. Poultices and the steam kettle were ordered, along with 10 minims of digitalis every four hours, and stimulants *ad libitum*. At 5.30 the symptoms had not improved; the temperature had risen to 102°·4; the pulse was 180; respiration 56. Dr James kindly saw her, but could find nothing in the chest to account for the symptoms.

The same symptoms continued, and two days afterwards distinct dulness was made out over the left base, while tubular breathing was heard. The cough was accompanied by rusty sputum. The rapid pulse continued, so strophanthus, 10 minims every four hours, was substituted for digitalis. This lowered the pulse, and the patient gradually recovered. During this week, which was one of considerable anxiety, the patient took nourishment well, and had no abdominal symptoms. On questioning her, it was found that on the day preceding the operation she had a distinct rigor. On the day of the operation she was so nervous and excited that no special chest symptoms were noticed, but

from her subsequent history it was evident that she had passed through a sharp attack of pneumonia. The extreme rapidity of pulse may also in some way be accounted for by shock.

The ovary removed was enlarged, hard in portions, cystic in others. There was a corpus luteus of menstruation present (menstruation began on the day of operation). The outer end of the Fallopian tube was glued to the upper surface of the ovary. The tube was greatly thickened. The patient's condition has not been improved by the operation; she has now as much pain as before, which is accounted for by the operation being an incomplete one.

CASE IX.—*Cystic Degeneration of both Ovaries; Cirrhosis of the Left.*

Mrs S., æt. 36; married seventeen years. Has had five children and two miscarriages. The youngest child is 6 years old. The last miscarriage took place four years ago. She has had very severe pain in her left side ever since her last miscarriage, and for the last two years she has been nearly bedridden. Last May she had typhoid fever. In the earlier part of her illness she had menorrhagia. Since her attack of typhoid the discharge has been less in amount. She is very emaciated, and is unable to walk.

Physical Examination, 18th October 1887.—The vaginal portion is enlarged and indurated. The body of the uterus is small and in good position. To the right of the uterus a round, elongated body can be felt running out to the side wall of the pelvis. On the left side a small round fluctuating swelling can be palpated. The examination is painful. The operation was performed on 22nd October 1887. On entering the peritoneal cavity a round cystic mass was felt lying to the right of the uterus. This mass was easily brought to the surface, but was found to be too large to pass through the abdominal wound, which on that account had to be enlarged. While drawing through the mass a cyst the size of a walnut burst. The left ovary was felt to be enlarged and cystic, and lying in a mass of adhesions, on breaking up which, to free the ovary, the cyst burst. Owing to the adhesions shortening the broad ligament, the pedicle was ligatured with difficulty. The recovery was uneventful, and the patient now is free from pain, and her general health has greatly improved.

CASE X.—*Retroflexion of Uterus; Cystic Degeneration of Right, Cirrhosis of Left Ovary; Chronic Salpingitis.*

Mrs R., æt. 35; married fourteen years; vi.-para. Youngest child was born three years ago. Complains of constant pain in the back, shooting down the legs, and of pain in both iliac regions. When about 17 years of age her periods became painful, and have continued so ever since. She married at 21, and had dyspareunia until her first child was born. After her first confinement she says her womb came down, and since then she has complained of

down-bearing pains. She always menstruated while nursing until pregnancy supervened. She is very anæmic and highly nervous.

Physical Examination.—Vagina short; vaginal portion natural. Body of uterus is felt through the posterior fornix occupying Douglas's pouch, and forming an acute angle with the cervix, is movable, not specially tender, and is slightly enlarged. The right ovary is easily felt lying behind the uterine body, and is very tender when touched. The left ovary is smaller, and not so deeply prolapsed.

The patient refused to leave the Home until operated on, so I had to consider what was best to be done. Although the uterus was easily replaced to its normal position, no form of pessary could be worn on account of the pain which its presence excited from pressure on the prolapsed ovaries. As the uterus was movable, shortening of the round ligaments was first thought of, but was abandoned for the reason that the condition of the ovaries was unknown as to whether they were diseased or not, and also whether or not they were adherent; though with regard to the latter point it might be inferred from the mobility of the uterus that the adhesions, if existent, would be slight. Accordingly it was determined to open the abdomen, and, if the appendages were found healthy, to perform hysterorraphy, and, if diseased, to remove them. On opening the abdomen, the body of the uterus was found to be slightly enlarged in a uniform manner, with its body occupying the pouch of Douglas, being acutely bent backwards on the cervix. The displacement was easily undone, there being no adhesions to prevent its replacement, while the portion where the bend occurred, viz., at the junction of body and cervix, was found to be very flexible. The left ovary was distinctly diseased, while the tube and broad ligament were greatly thickened and highly congested. Accordingly they were removed. The right ovary was small and entirely cystic, and the right tube and broad ligament were similar to the left. They were also removed and the wound closed. The uterus was not suspended.

It is now four months since the operation, and I examined the patient a few days ago, when the body of the uterus was felt through the anterior fornix in the position of anteflexion. She is now free from all pain.

The result of this operation is highly satisfactory, and shows that in some cases of retroflexion where the appendages are removed that it is unnecessary to suspend the uterus.

CASE XI.—*Defective Development of Uterus; Malformation of Appendages.*

Mrs H., æt. 26; married four years; has had no children. Patient came to me in February 1887, complaining of pain in her left side, and of amenorrhœa. Her menstruation had always been

irregular and painful, and the flow scanty. Two years ago the discharge gradually diminished in amount till it disappeared altogether. Since its disappearance the pain has been excessive and of constant duration, altogether unfitting her for any duties. She has had frequent bleedings from the nose and ears. The vaginal portion of the cervix is conical in shape, having a pinhole os; the body of the uterus is small and anteflexed. The ovaries are not felt.

I felt sure that the constant pain from which this patient suffered was not due to the uterus, but to some abnormal condition of the appendages, the nature of which could not be diagnosed. As the pain had always been in the ovarian region, and with the cessation of menstruation had become greatly aggravated, some developmental abnormality of ovaries or tubes was thought to be the cause. She was subjected to palliative treatment for a year, but without any success, and as the pain had rendered her bedridden, at her earnest request I operated.

When the abdominal cavity was entered and the pelvic contents carefully explored, a thick fleshy structure the size of the little finger was felt to leave the left ovary, which was in natural position, to be united in the middle line with a similar structure passing from the right ovary. They were joined together by a hard crustaceous material of about ¼ inch in length. On the right side, at a short distance from the juncture, another structure like a Fallopian tube passed downwards and backwards to the side wall of the pelvis, to which it was firmly attached. It had a free end resembling a Fallopian tube when cut across. These structures, along with the ovaries, were removed. The ovaries are of natural size, and contain in their interior some cysts containing a red granular substance. There are no corpora lutea. The tubes and broad ligaments are very much malformed, the nature of which I have not yet made out.

The patient recovered well. It is now three months since the operation, and during that time she has been entirely free from pain.

This case is instructive, inasmuch as it shows that in cases of defectively developed anteflected uteri, when the symptoms are severe, we require to look beyond the uterus to the appendages for an explanation. As the defect is a congenital one, it is most probable that it is not limited to the uterus. When dysmenorrhœa and intermenstrual pain in such cases are excessive, and are not benefited by remedies, in future I will have no hesitation in advising the patient to submit to the removal of her appendages.

CASE XII.—*Cystic Degeneration of both Ovaries; Small Parovarian Cyst on Left Side.*

Mrs S., æt. 24; married four and a half years; has had two children, the youngest one year ago. The patient menstruated first when 15 years old, and for two years was always sick and faint

on those occasions. At 17, the dysmenorrhœa became so severe that she had to keep her bed during the whole of her periods. She married at 20, and became pregnant three months afterwards, and throughout her pregnancy the pain was continuous, and compelled her to keep in bed. During labour the pain in her left side was so severe that she did not feel the labour pains. A year and nine months intervened before she again became pregnant, when, as before, the pain made her bedridden, and relief was only obtained from morphia. When 19 years of age she developed a cough and had hæmoptysis, which has troubled her more or less ever since.

On physical examination the uterus was felt in good position, small, and freely movable. The right ovary was easily felt, somewhat prolapsed posteriorly. There was considerable thickening of the right broad ligament. The left ovary was not distinctly felt.

The patient was an exceedingly frail, delicate woman, with a tendency to phthisis, and with a very bad family history. Though not sterile, her general condition was such that pregnancy was not desirable ; and as her pain made her a bedridden invalid, I thought it justifiable to advise removal of her appendages, which I knew were diseased and were the cause of her pain, so that she would have a chance of getting up her strength and be more able to combat her phthisical tendency. She herself was most anxious to have the operation performed. The appendages were accordingly removed two months ago. There were considerable adhesions in the right side. Both ovaries were cystic. The left one was exceedingly small, and in the left broad ligament there was a small parovarian cyst. The tubal fimbriated extremities were patent.

The patient made a good recovery, and is now free from pain, and her general health is much improved.

With the exception of Case VIII., which was an incomplete operation, the result of all these cases has been satisfactory. All have been relieved of the pain which rendered their lives wretched, and all have likewise greatly improved in general health. Sufficient time has not yet elapsed since the operations to allow me to speak of the remote effects, but I see no reason why their present condition should not continue. Older operators sometimes have had to record cases, which years after having been successfully operated on relapse into their former state of health, and suffer as much as previously, but these must be exceptional. The mortality of my cases has been *nil.* A low mortality is demanded in this operation, as it is one the object of which, in most cases, is to relieve pain, and to enable the sufferers to lead useful lives. In only two of my cases was the element of danger to life added to that of suffering. I refer to cases Nos. III. and VI. In the former a papillomatous cyst of the ovary was removed, the walls of which were very thin, and would probably soon have

ruptured, after which fatal infection of the peritoneum would have followed.

In Case No. VI., the tubes were distended with a clear fluid which at any time might have become purulent, and would have placed the patient in a dangerous position. It is unfortunate that often we are unable to diagnose the dangerous element beforehand, so that we could recognise the risks a patient is running, and urge immediate operation. But the signs and symptoms of the dangerous cases are often less marked than those that are less serious, and frequently it is only after the abdomen has been opened that such a perilous condition as pyosalpinx is discovered.

In Case No. VI., hydrosalpinx was not diagnosed because it was not felt. A dilated tube which is not tensely filled, or an ovary entirely cystic, may convey no sensation to the hand during abdomino-vaginal palpation any more than bowel, for the reason that there is no sense of resistance. Palpation may also reveal nothing when the ovary and tube are absent, or are imbedded in adhesions behind the uterus, in which case the uterus may be fixed as in Case No. VIII.

In Case No. IX., while removing the left ovary, which was cystically enlarged, the cyst burst, and the ovary presented the appearance of cirrhosis, being small and of hard consistence; and this suggests to us the question, whether or not some cirrhotic ovaries may not have been in the first place cystically enlarged, and that the cysts have ruptured, leaving the ovary small, hard, and cirrhotic.

Cystically degenerated ovaries contain very little ovarian tissue, and when the cyst contents are removed there is only the stroma, which is small in amount, left. The ovary under consideration might be called cirrhotic now that it is minus the cyst. Doubtless rupture of cysts frequently occurs in patients, and accounts for the changes in physical signs sometimes met with. In more than one case that I have had under observation, I have been surprised at the changes which take place in the physical conditions of disease of the appendages from time to time. In patients in whom I have distinctly felt cystic masses at one time, at subsequent examinations I have not been able to recognise these masses, and have been under the impression that my first diagnosis was erroneous. Occasionally we meet with cases where along with changes in physical signs the symptoms disappear, and if one cause of pain is tension, it is evident that rupture of cysts and relief of tension may bring about alleviation of symptoms. In one of my cases, No. V., the ovaries were felt enlarged—cystic at one examination, while at a later examination no enlargement, cystic or otherwise, could be felt. In her case, however, there was no improvement of symptoms.

In another case, No. X., one ovary was cirrhotic and the other

cystic, so that one ovary may have been more advanced in the diseased process than the other.

As preparatory treatment in those who are to undergo an operation, I always give remedies directed to improve the digestion, and make it a rule, unless the symptoms are urgent, never to operate until a patient's tongue is clean. As a result of this treatment, chloroform sickness after an operation is very rare. On the other hand, if chloroform is given to a patient with a dirty tongue, sickness in my experience is sure to follow. As one of the advantages claimed for ether is that it causes less sickness than chloroform, and as patient No. VI. had suffered from dyspepsia for years, and had a large cracked thickly coated tongue, it appeared a good test case for ether; so the latter anæsthetic was given. The sickness following the operation was trifling. In no other way, however, do I think that ether is superior to chloroform, unless it be in patients who are very weak, and even in them, unless the operation is a long one, chloroform is quite as satisfactory as ether, because the former acts as a cardiac stimulant for a certain length of time. Should the operation be a prolonged one, ether should be given along with chloroform, simply for its stimulating effect.

It is interesting to note that none of the cases could be traced to have their origin in gonorrhœa, but, except in recent cases, it is frequently very difficult to obtain a history of gonorrhœal infection.

I feel under a deep debt of gratitude to Mr Caird, Drs Melville Dunlop, Hogarth Pringle, Haig Ferguson, and others, for the kind and able assistance which they have freely given me at these operations. To Mr Caird I am specially indebted for his valuable aid as chief assistant, the value of which no words of mine can fully express.

No.	Place of Operation.	Age.	Nature of Case.	Adhesions.	Date of Operation.	Result.
1	Patient's House.	26	Salpingitis. Prolapsed ovaries.	None.	Feb. 1886.	Greatly improved.
2	Patient's House.	30	Cystic degeneration of ovaries.	None.	June 1886.	Cured.
3	Patient's House.	31	Papilliomatous cyst of ovary.	None.	Aug. 1886.	Cured.
4	9 Queensferry St.	37	Cystic degeneration of ovaries. Chronic salpingitis.	Pelvic.	Dec. 1886.	Cured.
5	8t Kessog's Home.	32	Cirrhosis of ovaries.	None.	Sept. 1887.	Cured.
6	8t Kessog's Home.	33	Double hydro-salpinx.	Pelvic.	Aug. 1887.	Cured.
7	8t Kessog's Home.	37	Myoma of ovary. Chronic salpingitis.	Pelvic and omental.	Oct. 1887.	Cured.
8	8t Kessog's Home.	33	Chronic ovaritis.	Entirely imbedded.	Oct. 1887.	No better.
9	8t Kessog's Home.	36	Cystic degeneration and cirrhosis.	Left ovary imbedded.	Oct. 1887.	Cured.
10	8t Kessog's Home.	35	Retroflexion. Cystic degeneration and cirrhosis. Salpingitis.	None.	Jan. 1888.	Cured.
11	8t Kessog's Home.	26	Malformed Appendages.	Pelvic.	Feb. 1888.	Cured.
12	8t Kessog's Home.	24	Cystic degeneration. Small parovarian cyst.	Pelvic and abdominal.	Mar. 1888.	Cured.

Dr Halliday Croom had pleasure in congratulating Dr Brewis on his paper, in which there was not room for adverse criticism. Dr Croom cited the case of a patient, who had a large fibroid tumour reaching up to the umbilicus, for which Mr Lawson Tait removed the ovaries, with the result that the patient bled continuously, and ultimately died of anæmia. Dr Croom said that he also, like Dr Brewis, had had an incomplete operation in a case in which he was unable to remove one ovary, which was fixed deep down in the pelvis by strong adhesions. The tube, however, was removed. The patient was relieved of her symptoms, but a sinus formed, running from the abdominal wound down to the ovary, through which the patient menstruated every month.

Dr Freeland Barbour congratulated Dr Brewis on his success, and asked if menorrhagia were a permanent symptom in any of the cases. In a large number of patients with diseased appendages, which Dr Barbour had watched, it seemed to him that in none of them was the pain sufficient to justify operative interference.

Dr Berry Hart said that Dr Brewis's paper was a model from a clinical point of view. The cases were concisely, and at the same time thoroughly recorded. He was glad to hear that Dr Brewis was investigating the pathology of the diseased structures.

Dr Brewis thanked the Society for the kind reception which they had given to his paper. He said that it was well known that if the entire ovary be not removed that bleeding may continue, and in the case mentioned by Dr Croom a small portion of ovary may have been left behind, or the hæmorrhage may have been due to changes taking place in the tumour itself. With regard to Dr Croom's incomplete operation, it differed from his (Dr Brewis's) in that the tube was removed, while in Dr Brewis's case neither tube nor ovary was removed. In some of the cases menorrhagia was present, but was not the symptom for which the operation had been performed. In each case the operation was performed for pain. Pain is in all cases a question of degree, the amount of which is often difficult to estimate, and each case must be judged by itself as to whether or not an operation is justifiable. In Dr Brewis's cases the relief which the patients have experienced, and the diseased appearance of structures removed, prove that operative interference was necessary.

III. A CONTRIBUTION TO THE ANATOMY AND CLINICAL HISTORY OF INCARCERATION OF THE RETROFLEXED GRAVID UTERUS, by *Dr Halliday Croom.*

Dr Freeland Barbour said that Dr Croom's case had some interesting points. He agreed with Dr Croom, that conception in the retroflexed uterus was more frequent than was generally supposed. The majority right themselves, and are not seen by the physician. Dr Barbour described a case which was retroflexed before pregnancy, but which replaced itself between the eighth and tenth

week. During the interval and in the earlier weeks of pregnancy it became again retroflexed, and subsequently replaced itself about the same time as on the first occasion. During five years at the Cowgate Dispensary, Dr Barbour had only seen two cases of retroverted gravid uterus giving rise to symptoms. The length of the cervix, in Dr Croom's valuable preparation, was interesting as accounting for the fact that the bladder was not tilted upwards. Though the utero-vesical peritoneum was high, for some reason the cervix had elongated instead of being tilted upwards, and the bladder being in relation to the cervix had remained still in great part a pelvic organ. Dr Barbour thought that retention was frequently caused by a kink in the urethra, and did not result from pressure.

Dr Ballantyne had seen two cases of retroflexed gravid uterus in the Buchanan Ward; one replaced itself, the other had to be replaced.

Dr Berry Hart said the case was difficult to diagnose. He was not astonished at the elongation of cervix, as it was likely to occur wherever you had traction exerted either by the distending bladder or uterus. It was common to have spontaneous replacement, and Dr Hart thought that the bowels had something to do with it. He thought that Dr Croom had recorded a case of great interest.

Dr Halliday Croom briefly replied.

IV. THE LABIA MINORA AND HYMEN.

By J. W. Ballantyne, M.B., M.R.C.P.Ed., Assistant to the Professor of Midwifery in the University of Edinburgh.

It is my wish in this communication to lay before this Society some observations on the *structure* of *normal* and *hypertrophied labia minora*, to record the appearances presented by the *hymen* in cases of vaginismus, and to consider the theories recently brought forward to explain the development of the hymeneal membrane.

Normal Anatomy of the Labia Minora.

The labia minora, labia internæ, or nymphæ, are in the older works on the anatomy of the external genital organs, and in most of the recent treatises on the subject, termed folds of mucous membrane; but, according to Langer, Aeby, Klein, Frey, Gerlach, Toldt, Carrard, Hart and Barbour, Parvin, and others, they are to be regarded as composed of skin. Dr Henry Coe, writing in the *American System of Gynecology and Obstetrics*,[1] suggests the term muco-cutaneous as a compromise; but it is difficult to see what practical gain is obtained by adopting this term, and, further, Sir William Turner several years ago proposed the same descriptive

[1] *American System of Gynecology and Obstetrics*, vol. i.

phrase in speaking of the nymphæ. It is evident, therefore, that there is much difference of opinion with regard to the nature of the labia minora, and it is the object of this paper to examine both macroscopically and microscopically, healthy and hypertrophied nymphæ, in order to see whether the vexed question of skin *versus* mucous membrane cannot be definitely settled.

Naked-Eye Anatomy of the Labia Minora.

The labia minora are two folds, usually symmetrical, which lie nearer the middle line than the labia majora, and form the lateral boundaries of the vestibule and of the vaginal aperture. They are directed backwards and outwards, diverging in this way from the middle line. In the female child at birth the nymphæ are well seen, because at this time the labia majora are comparatively less developed; in the virgin the labia minora are hidden from view by the labia majora; in the woman who has borne children they are somewhat more exposed to view; and in the aged they are visible on account of the gaping condition of the vulva there present.

In the virgin the labia minora have a distinctly mucous membrane-like appearance, being rose-red in colour, but as age advances they become firmer in consistence, darker in colour, and more like skin. Their appearance has by some been likened to that of a cock's-comb.

Each labium minus has an outer surface, which is applied to the inner surface of the labium majus of the same side, and an inner surface partly in contact with the inner surface of the labium minus of the opposite side, and hiding from view the vestibule, meatus urinarius, and vaginal aperture. At the base of the inner surface of each labium minus is to be seen, in most cases, the "white line," to which attention was drawn in 1882 by Dr Berry Hart. This white line is similar to that described by Hilton as forming the boundary between the skin round the anus and the mucous membrane, and its presence was brought forward by Hart to prove that the labia minora were composed of skin and not of mucous membrane, for this line can be seen running internally to the bases of the nymphæ. This "white line" is readily to be seen in most women. The free border of each labium minus is irregular and dentated, whilst the attached border is fixed in front to the side of the vestibule, and behind to the inner surface of the labium majus of the same side.

The anterior extremity of each nympha divides into two at the side of the clitoris. The upper part passes above the clitoris, and unites with that of the opposite side to form the fold known as the prepuce of the clitoris; the lower part meets that of the opposite side below the clitoris, and forms the frenulum of that organ. This bifurcation of the anterior or upper end of the labium minus is

well seen in the sketch of the external genitals of the child (*vide* Fig. 1).

With regard to the termination of the labia minora posteriorly authorities are at variance, some holding that the labium minus blends with the labium majus of the same side about its middle; others, however, state—and I believe this to be the correct view—that the labia minora are not lost on the inner surface of the labia majora, but reappear posteriorly to the vaginal orifice, and are there united by a fold known as the fourchette. This arrangement of the nymphæ can be best seen in the child; it is not so evident in the adult woman. In some cases the labia minora are seen to form the fourchette directly, and in such cases rupture of the perineum very seldom occurs during labour,—a fact which is probably to be accounted for by the greater distensibility of the fourchette formed by the nymphæ. In support of the view that the fourchette is the posterior junction of the labia minora, we find that the structure of the fourchette very closely resembles that of the nymphæ; and, further, the "white line" can be traced running internally to the fourchette, but externally to the base of the hymen. Hart and Barbour state that the fourchette is the junction of the labia majora posteriorly; but in none of the specimens that I have examined was I able to trace this connexion, and the fact that there is such a close resemblance between the minute anatomy of the fourchette and that of the nymphæ is an additional argument in favour of their close anatomical relations.

On making a section of a labium minus we find that to the naked eye it presents the appearance of fibro-elastic tissue arranged in a network, and supporting a rich venous plexus. Gassenbaur gives to this tissue the name of cavernous. Kobelt regards the nymphæ as non-erectile structures, but in at least one case, which I have seen, there was a history of periodic enlargement of the nymphæ. In this case, however, as will be afterwards fully pointed out, the labia minora were much hypertrophied, and differed in their minute anatomy from the healthy structures. There are no hairs visible on the labia minora, but even by the naked eye the openings of large sebaceous glands can be seen on their surface. The nymphæ contain no adipose tissue.

A consideration of the gross anatomy of the labia minora does not, I think, warrant us in stating conclusively that these structures are skin and not mucous membrane. To the naked eye they very closely resemble mucous membrane, and this is more evident in the virgin than in the married woman. But there are certain points even in the gross anatomy which would lead us to consider the labia minora as cutaneous and not mucous structures. There is, first, the presence of the numerous large sebaceous glands, even although these are not accompanied by hairs; and there is, secondly, the existence of the white line, which we are, I think, justified in regarding as the boundary between skin and mucous membrane.

To Dr Berry Hart belongs the credit of having drawn the attention of this Society to the presence of a white line internal to the labia minora, and similar to that pointed out by Hilton as marking the line of demarcation between the skin round the anus and the anal mucous membrane. Dr Hart, in his "Note on the Naked-Eye Anatomy of the Female External Genitals,"[1] says, "We can trace the line of demarcation between skin and mucous membrane as running along the base of the inner aspect of each labium minus, and passing into the fossa navicularis, separating its skin boundary, the fourchette, from the mucous membrane over the hymen." Hart's observation has since been confirmed clinically by numerous observers, and forms the strongest argument in favour of the tegumentary character of the nymphæ which can be drawn from a study of their macroscopic anatomy.

Microscopic Structure of the Labia Minora.

Let us now examine the microscopic anatomy of the nymphæ in order to see whether there are any characters which may justify us in regarding these structures as being composed of skin. Henri Carrard (*Zeitschrift für Geburtshülfe*, Band x.) has specially investigated the minute anatomy of the labia minora, and from the observations I have been enabled to make upon the nymphæ of the newly-born child and of the adult, I am in a position to endorse most of the statements that he has made. With regard to the minute anatomy of the labia minora in the newly-born child, I have made sections at the level of the vestibule, of the meatus urinarius, and of the vaginal orifice, and have found at all these levels the same characteristic structure. On the surface there are several layers (two, or three, or four) of squamous epithelium consisting of flat, non-nucleated cells. There is below this an ill-defined stratum lucidum, and beneath this again there is a very well-marked zone of nucleated prickle cells, the lowermost layers of which contain pigment granules. The prickle cell layer stains deeply with reagents, *e.g.*, osmic acid, nitrate of silver, Bismarck brown, methyl blue, iodine green, or picro-carmine. The prickle cells lying nearest the surface are somewhat flattened, those lying beneath are more polyhedral in shape, whilst those of the lowest layer are columnar, and are set vertically on the subjacent papillæ. We find here, therefore, a distinct stratum corneum, and an equally well-marked stratum malpighii or rete mucosum. Under the layer of prickle cells we find papillæ not so well seen in the labia minora of the child as in those of the adult woman. The papillæ consist of dense connective fibrous tissue with many elastic fibres, and are continuous with the underlying subcutaneous tissue. In this connective tissue we find sebaceous glands lying, the ducts of which perforate the prickle cell layer and the squamous epithelial

[1] *Edinburgh Medical Journal*, Sept. 1882, pp. 264-5.

layer. According to some there are no sebaceous glands in the labia minora at birth. In the cases I have examined I have, however, always found sebaceous glands, but not in anything like the numbers that are present in the labia minora of the adult. The sebaceous glands are certainly not confined to the outer aspect of the labia, as has been stated by Satterthwaite. In not one of the sections I have made have I seen any hairs; the ducts of the sebaceous glands open on the free surface. The fact that the sebaceous glands are here dissociated from the hair follicles is peculiar, but is not unique, for on the volar side of the hand and foot, and on the skin of the penis, we find also sebaceous glands without accompanying hair follicles. In the connective tissue we find also numerous veins and capillaries, and surrounding the vessels non-striated muscular fibres are to be seen in small amount. In the papillæ are vascular loops with small veinlets passing from them to join the underlying veins. In the nymphæ of the child I have not been able satisfactorily to demonstrate the existence of the Meissner nerve-endings, but in the labia of the adult and in some hypertrophied labia they are very manifest. The rest of the substance of the labium minus in the child is composed of the fibro-elastic network with numerous vessels, nerves, and lymphatics.

On comparing the structure of the labia majora in the child with that of the labia minora, we note the presence on the former of a much better marked stratum corneum and rete mucosum, and the existence of much adipose tissue and of numerous hairs connected with the sebaceous glands. In the labia minora of the child I have not seen any adipose tissue whatever. There is no difficulty at all in distinguishing the labia minora and majora under the microscope.

With regard to the labia minora in the adult, we find essentially the same arrangement of parts as in the labia of the infant. There are, however, certain differences. Thus, pigment granules are much more numerous in the lower layers of epithelium, the epithelial layers themselves are thicker, and, as a rule, a distinct stratum lucidum can be made out. The nerve end-organs are also prominent structures in the labia of the adult. In the papillæ are to be seen the tactile corpuscles of Meissner. Carrard has drawn special attention to these Meissner corpuscles, and has pointed out that they have hitherto only been determined on the skin of the palm of the hand, sole of the foot, on the edge of the eyelids, the male and female nipples, the clitoris, volar surface of the forearm, and the red border of the lips. These corpuscles are oval in their shape, have a fibrous capsule, and are connected with a medullated nerve-fibre, which winds round the corpuscle and penetrates the capsule, loses its sheath, and becomes coiled up in the interior of the corpuscle. The nerve end-organs in hypertrophied labia minora are, as Carrard was the first to point out, altogether

peculiar, and will be alluded to when we come to look at the specimens of enlarged labia. I have found no mucous glands in the labia minora.

From a study, then, of the minute anatomy of the healthy labia minora, we get additional evidence in favour of the view that these structures are composed of skin, and Carrard considers this evidence to be conclusive. The arrangement of the epithelium, the presence of the sebaceous glands, the absence of mucous glands, and the existence of the peculiar nerve-terminations, all support the view that the nymphæ are tegumentary in character. At the same time, I do not think that the evidence derived from the minute anatomy is altogether conclusive, and the value placed upon the presence or absence of the structures above named comes to be very much a matter of opinion among different histologists.

In their development the labia minora are epiblastic structures, but this fact in itself does not, of course, warrant us in concluding that they are tegumentary, for, to take only one example, the mucous membrane of the mouth is epiblastic.

From a study of the pathology of the labia minora we are, I think, warranted in drawing certain inferences as to their normal structure. Carrard has carefully figured and described hypertrophied nymphæ from pruritus cases, and upon the appearances seen in them draws additional proof in support of the idea that the labia minora are tegumentary in character. In two cases in which the nymphæ were considerably enlarged I have been able to examine their structure, both macroscopic and microscopic.

The first patient, Miss G., was under Professor Simpson's care last autumn for weakness of the lower limbs, she being quite unable to walk. The labia minora were much enlarged, and as they gave rise to considerable inconvenience and irritation, Dr Simpson removed them by the thermo-cautery. The patient had for three months the Weir Mitchell treatment by massage and feeding with large quantities of milk, and is now almost entirely well. The labia minora which were removed were about 4 c.m. in length and ½ c.m. in thickness, their free margins were irregularly dentated, their surfaces were thrown into numerous rugæ, and they were darkly pigmented. One, the left, was slightly larger than the other. In this case there was no indication of syphilis. Masturbation was not inquired into.

We shall return to the consideration of the minute anatomy of these nymphæ after having narrated the history of the second case. Miss A. P., aged 18, was an inmate of the Buchanan Ward, Royal Infirmary, in December 1887 and January 1888. She was sent in as a case of hermaphroditism. She complained of swelling in the private parts interfering seriously with walking, and of pain, sharp and continuous, in the swelling. She had noticed the swelling first eight years ago. The menstrual flow was normal in type and habit. There was a family history of phthisis.

On examining the external genitals both the labia minora were found to be enlarged, but the left much more so than the right. The left nympha had a pyramidal form, and was divided into two portions by a deep furrow, and in the furrow was a piece of common twine. Its base of attachment measured $3\frac{1}{2}$ c.m. in length, and the distance from the base of the labium to the apex of the constricted part was 4 c.m., whilst its greater thickness was 2 c.m., and the thickness of the labium at the furrow was $\frac{1}{4}$ c.m. The whole surface was covered by a great number of rugose folds, and the whole labium was of a yellowish-brown colour.

The right nympha was smaller. Its base of attachment measured 4 c.m., its thickness was $\frac{1}{2}$ c.m., and the distance from the base to the free margin was 3 c.m. It also was covered by a multitude of folds and was pigmented. There was no constriction similar to that seen on the left labium. The enlarged labia were tender to the touch, and the patient stated that at times they became swollen and very painful. She disowned all knowledge of anything that might have led to the constriction, but as she contradicted herself on cross-examination, not much reliance can be placed upon her statements. The string had evidently been recently applied, as there was no ulceration. The enlarged nymphæ were removed by Paquelin's cautery. The appearance of the labium with its constricted apex had suggested the idea of hermaphroditism. The patient denied masturbation.

Let us now look at the microscopic characters of the nymphæ in those two cases. In the first case, that of Miss G., sections of both labia were made and stained with the various reagents, picro-carmine, logwood, eosine, methyl blue, Bismarck brown, iodine green, nitrate of silver, osmic acid, etc. The first characteristic which is readily apparent to the eye on examining these sections is the enormous number of sebaceous glands which can be seen (*vide* Fig. 2). No hairs are to be demonstrated, the sebaceous glands opening alone upon the surface by narrow ducts. Each gland consists of several oblong alveoli lined by small polyhedral, granular, epithelial cells, and containing large polyhedral cells with oil globules. These sebaceous glands are not confined to one or other surface of the labia minora, but occur under the epithelium at all points. We have to note an increase in the connective tissue stroma as compared with the healthy labia, but there is no great increase in the bloodvessels, neither are there any hæmorrhages.[1] There is a total absence of adipose tissue. Nerve end-organs are to be seen, notably the Meissner tactile corpuscles, but they are small in number, and their scarcity is especially to be noticed when we compare these sections with those obtained from the labia minora of the second case. The epithelial layers, stratified squamous and prickle cells, are well developed, and greater in extent than in healthy labia

[1] The capillaries, however, are seen to be dilated.

minora. These labia present appearances somewhat dissimilar from those figured by Carrard in his contribution.

On making a microscopic examination of the labia minora of the second case, we notice first the small number of sebaceous glands which are present. I have carefully examined a very large number of sections of the left labium minus, both below and above the point of constriction, and have found only a very few sebaceous glands. In the case of the right labium minus in some sections sebaceous glands are to be seen, whilst in other sections they are represented only by their atrophied remains; in still other sections there are no traces of them whatever. The epithelial layers present very much the same appearances as they do in the labia from the first case. I have not been able to demonstrate the adenoid tissue underlying the epithelial layers to which Carrard has drawn attention. The papillæ are very numerous, many of them are simply vascular, but a considerable number are nervous, containing nerve end-organs. Carrard describes three varieties of nerve terminal organs which he found in hypertrophied nymphæ. Those end-organs are, firstly, Meissner tactile corpuscles; secondly, globular terminal bulbs (kugeliger end-kolben) which are not to be found in healthy labia minora, but are normally present in the conjunctiva; and, thirdly, a form of nerve end-organ which Ihlder has described as existing in the tongue of birds, but which has not hitherto been observed in the human subject. The first of these varieties, namely, the Meissner corpuscle, is to be seen in healthy as well as in hypertrophied labia minora, but the second and third varieties are, according to Carrard, only to be found in the hypertrophied organs. I have been able to see the Meissner corpuscles, and the globular terminal bulbs, but have hitherto been unable to demonstrate the third variety, which would seem to be a transitional form (*vide* Figs. 3 and 4). The nerve fibres are also increased, and there is a most marked increase in the connective tissue of the labia minora. There was one symptom which was present in Carrard's cases, but absent in the patients whose labia I have examined, namely, pruritus, and this fact may, perhaps, account for some of the differences found on microscopic examination.

In the labia of the first case (Miss G.) I have, therefore, noted increase in the connective tissue, increase in the number of sebaceous glands and in the epithelial layers, but no increase in the nerve end-organs, nerves, or bloodvessels; whilst in the labia of the second patient (Miss A. P.) I have noted increase in the epithelial layers, in the nerve end-organs (Meissner corpuscles, and globular terminal bulbs), and in the connective tissue, great scarcity of sebaceous glands in the left labium minus, marked diminution in their number in the right labium, and an absence of vascular enlargements. A very striking microscopic feature is the presence of the sebaceous glands in great numbers in the organs

of the first case, and their great scarcity in at least one of the labia in the second case. This would seem to point to a condition in the nymphæ similar to fine cirrhosis, causing increase in the connective tissue, and subsequent atrophy of the sebaceous glands.[1] The labia minora in the second case probably show only in an advanced stage the same process which is at work in the labia of the first case.

Whilst the microscopic appearances of hypertrophied nymphæ are thus interesting from many points of view, they also, I think, furnish us with additional proof with regard to the tegumentary character of the labia minora. The presence of the white line in the naked eye anatomy of the parts, the microscopic features of healthy fœtal and adult nymphæ, and the microscopic appearances of hypertrophied labia minora, form a conclusive series of arguments in favour of the statement that these structures are skin and not mucous membrane.

The Hymen.

Some interesting communications have within the last few years been made to the study of the nature of the hymen.

Budin, in 1879, stated that the hymen was simply the anterior end of the vagina projecting like the finger of a glove into the vulva, and the fact that the vaginal rugæ can be traced on the vaginal aspect of the hymen lends some proof to this statement. Matthews Duncan has found, however, that in some cases where no vagina was present there yet existed a hymeneal membrane; he, therefore, argues that the hymen must be developed from the external genitals, and cannot be simply the lower end of the vaginal canal.

Bland Sutton,[2] in the November of 1887, read a paper before the British Gynæcological Society on the nature of the hymen, and in his contribution brought forward a new argument with regard to its origin.

He studies the subject from the embryological standpoint, and finds in the development of the anus and rectum a hint as to the nature of the hymen. The proctodœum, or anal involution, invaginates till it meets the blind extremity of the gut, the two fuse together to form the cloaca, and the distinction between the two component parts is preserved in the mature condition by the presence in the rectum of a ridge of adenoid tissue, which marks the spot where the epiblastic squamous epithelium of the anus meets the hypoblastic columnar celled epithelium of the rectum. Sutton further finds that on examining the anterior part of the cloaca, the urino-genital sinus, which has become shut off from

[1] In support of this view, I have been able to demonstrate sebaceous glands breaking down and becoming atrophied.

[2] *British Gynecological Journal*, vol. iii. p. 517.

the gut by the down-growth of the perineal body, there is to be seen a membrane known as the hymen, which he regards as the homologue of the ridge of adenoid tissue in the rectum. Bland Sutton, therefore, defines the hymen as a "thin septum resulting from the imperfect coalescence of the proctodœum with the urino-genital section of the cloaca," for he says, "where two culs-de-sac come into contact, and exert pressure upon each other, the edges gradually cohere and join organically; the thin septum thus produced gradually thins until a perforation results." We have thus an explanation of the varieties of hymen met with—the crescentic, imperforate, cribriform, and the like. Bland Sutton finds an additional argument in support of his view from the occasional occurrence of a membrane, either imperforate or in the form of a hymen-like diaphragm, in the pharynx. This membrane marks the point at which the involution of the surface epiblast, or stomodœum, has met the blind anterior end of the foregut.

Bland Sutton's observations are extremely interesting, but I think those of Pozzi, which were recorded in the *Annales de Gynécologie* (vol. xxi.), are even more so.

Pozzi noted that in the case of a male hypospadiac, where the urethra opened beneath the glans penis in a space corresponding to the vestibule in the female, there was to be seen a band stretching from the penis to the meatus urinarius encircling this aperture, and becoming continuous with a membrane which closed a pseudo-vulvar aperture. This structure Pozzi calls the balano-urethral or vestibular band. In a second case, that of a young girl with no vagina, and as far as could be made out no uterus or ovaries, Pozzi found a band stretching from the base of the clitoris downwards in the middle line to the base of the vestibule, where it encircled the meatus urinarius, and became continuous with the hymen. This structure he terms the male vestibular band in the female.

The male vestibular band is rarely to be seen in the healthy adult woman, but it is fairly constantly present in the newly born female child (*vide* Fig. 1). In the case of the male hypospadiac, Pozzi regards this band as the representative of the spongy portion of the urethra, and the hymen-like membrane as the bulb of the urethra which has remained in a membranous and non-erectile condition. He further extends the argument to the adult female, and regards the male vestibular band in the female as the homologue of the corpus spongiosum, whilst the hymen he looks upon as being homologous with the bulb of the urethra. He, therefore, considers the hymen to be formed from the external genital organs, and does not look upon it as the lower end of the vaginal canal.

I have made sections of the external genital organs of the newly born child at the level of the vestibule (*vide* Fig. 5), in

Fig. 1.

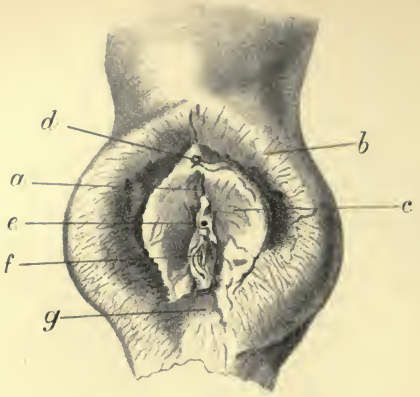
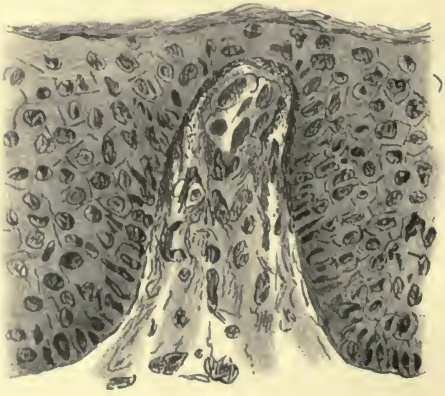


Fig. 3.

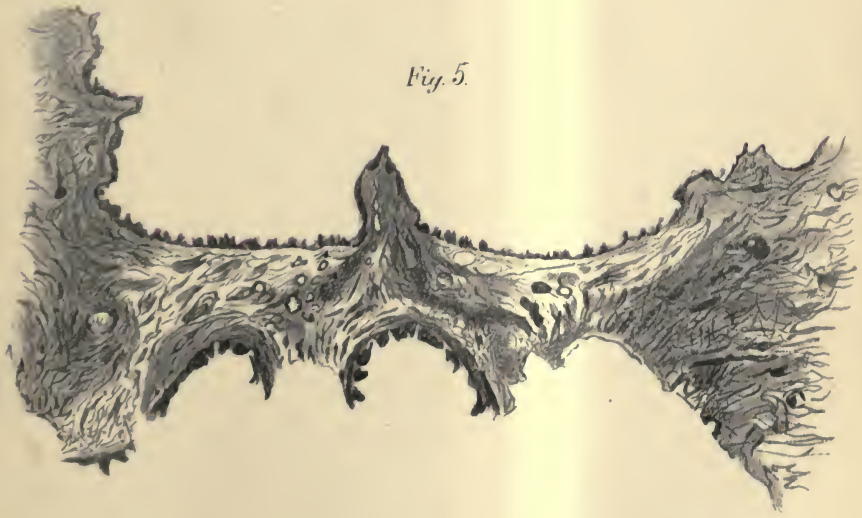
Fig. 4.



Wm. Cathie

Fig. 2.

Fig. 5.



order to note whether any anatomical substratum could be found for the ridge which was undoubtedly to be seen in the middle of the vestibule. In these sections I found in the middle line a distinct ridge stretching from the base of the clitoris to the meatus urinarius, and becoming apparently continuous with the hymen. The connective tissue underlying this ridge is denser than that under the vestibule generally, and many yellow elastic fibres are to be seen in transverse section. The epithelial layers covering the band are similar to those which exist over the vestibular surface generally. There would seem, therefore, to be some evidence which will enable us to regard this band as a distinct anatomical structure, and possibly as the membranous representative of the corpus spongiosum in the male, but we must also bear in mind the possibility that this band may be only a fold in the vestibular mucous membrane, caused by the fact that during intra-uterine life the fœtus lies with its thighs adducted and flexed upon the abdomen. At the same time, it must be remembered that this band is occasionally seen in the adult female.

The investigations of Matthews Duncan, Pozzi, and Bland Sutton prove, I think, conclusively that the hymen is derived from the vulva and not from the vagina.

Several interesting observations have recently been made upon the pathology of the hymen, and in two cases of vaginismus which were operated upon by Professor Simpson, I have been able to examine microscopically the hymeneal remains which were then removed.

Both cases were typical ones of vaginismus, and in both Dr Simpson made lateral incisions posteriorly, and clipped away the remains of the hymen. Of these remains microscopic sections were made, and these sections show a fine connective tissue basis with an enormously thick epithelial layer. The epithelium is squamous on the surface, there is a beautifully marked stratum lucidum, and an extremely thick zone of prickle cells. Into the prickle cell layer project very many papillæ. The surface rises in folds. At many points there seems to be a folding inwards of the surface epithelium, and as a result of this numerous spaces are to be seen lined with the prickle cells. These appearances may explain the development of the so-called cysts of the hymen, which have been recently described (*Archiv f. Gyn.*, Bd. xxiii.–xxix.) I think that from the microscopical appearances we are warranted in calling these hymeneal remains papillomata.

DESCRIPTION OF PLATES.

Plate I.

The external genitals of a new-born child, showing (*a*) the male vestibular band of Pozzi, (*b*) the labia majora, (*c*) and minora, (*d*) the clitoris, (*e*) the urethral aperture, (*f*) the hymen, and (*g*) the fourchette.

PLATE II.

Section of hypertrophied labium minus (case of Miss G.) showing numerous sebaceous glands and bloodvessels.

PLATES III and IV.

Section of hypertrophied labium minus (case of A. P.), showing nerve end-organ in papilla, and layers of epidermal cells. $Ag\,N\,O_3$.

PLATE V.

Section of external genitals of child, shown in Fig. 1, at the level of the vestibule, and demonstrating the male vestibular band as a distinct projection in the middle line.

Dr Freeland Barbour said the subject did not lend itself to discussion, but the thanks of the Society were due to Dr Ballantyne for his valuable paper and beautiful sections.

MEETING IX.—JUNE 13, 1888.

Dr UNDERHILL, *President, in the Chair.*

I. *Dr Brewis* showed a BARTHOLINIAN CYST of large size, which he had removed from a patient a short time ago. The patient said she first noticed it ten years ago, at which time she was troubled with vulvar irritation. It remained about the size of a walnut till four months ago, when the patient became pregnant, after which it grew rapidly; and when Dr Brewis excised it, it was about the size of a man's fist. The cyst is unilocular, and is simply the distended duct. The gland itself can be felt at one end of the cyst, in the interior of which the open mouths of two or three of the canaliculi can be seen. The interesting point is that it existed and remained stationary for ten years, and then *pari passu* with pregnancy rapidly increased in size.

II. A CASE OF PARASITIC FŒTUS.

By B. LANGLEY MILLS, F.R.C.S. Ed., Surgeon Medical Staff. Communicated by Dr HALLIDAY CROOM.

HAVING met with a very similar case of parasitic fœtus to that of Laloo related in the *British Medical Journal* for 25th Feb. 1888, I think a few notes on it are worth recording.

Soorunophur, aged 25 years, primipara, was delivered of a male child on 7th April 1888. Family history good. No history of fright during pregnancy. Parturition natural. The child was found to be a double monster, the growth of one-half having been arrested in utero. The autosite was perfectly formed, with the

exception of an extra lobe to the right ear. The parasite was attached to the lower part of the sternum, as in Laloo's case (*thoracopagus parasiticus*). The parasite was adherent in the mesial line above the ensiform cartilage. The woodcut, from a photograph, gives a fair idea of the condition four days after birth. Close above the adherent part of the parasite was situated a fleshy nodule about the size of a walnut, from which sprung two fleshy cords about two inches long, symmetrical on both sides and free at their extremities, containing no bones, and apparently representing the upper extremities. The lower extremities were perfectly formed, and attached by a loose fold of skin over the ensiform cartilage. They were freely movable, and apparently not connected in any way with the rudimentary upper extremities. Genital organs were present in the parasite, but in a rudimentary condition. A urethra was present, but no urine was noticed to pass from it. At the seat of the navel in the autosite there was a large pulsating purple tumour about the size and colour of the bowl of a full claret glass, obscuring the remains of the umbilical cord, and being, I think, some abnormal remnants of the pedicle of the allantois. The child died when a week old. No post-mortem examination could be obtained.

The President said the Society was grateful to Dr Mills for his interesting paper, but expressed regret that there had been no post-mortem examination.

Professor Simpson remarked that it was unfortunate that no dissection of the placenta had been made.

III. A SUCCESSFUL CASE OF CÆSAREAN SECTION.

By Surgeon-Major Arnott, M.D., Professor of Midwifery, Grant Medical College, Bombay. Communicated by the Secretary.

Gentlemen,—Some time ago I submitted for your consideration notes of a case of Cæsarean section in which death occurred in a sudden and unexpected manner more than a week after the operation, and which I claimed as a successful case, because the woman was carried safely through the risks of hæmorrhage and shock, did not suffer from any symptoms whatever indicating peritoneal mischief, and the wound had quite healed.

I now place before you a record of another case in which the woman recovered and is now alive, but she was for a long time detained in hospital on account of suppuration along the suture tracts in the subcutaneous tissue of the abdominal wall.

A. N., æt. 21 years, ii.-para, a Mohammedan (Blora) residing in the Blondi Bazaar, was admitted at 6.30 P.M. on May 10th, 1887. Labour pains had commenced at 8 A.M., and the membranes ruptured at 8 P.M. on May 9th, and she had been under the treatment of native midwives till admission. Her previous gestation terminated prematurely at the 7th or 8th month, and the child did not survive.

On examination the fœtus was found to be alive, and the heart sounds heard most distinctly a little below and to the left of the umbilicus. The uterine tumour was abnormally prominent and hard. External pudenda normal, vagina moist, cervix dilated, head presenting in the first position, pelvis much distorted, the true conjugate measuring about $1\frac{3}{4}$ inch, or less. Between ant.-sup. spines, $9\frac{1}{2}$ inches; external conjugate, 5 inches; transverse of outlet, $3\frac{1}{2}$ inches; diagonal conjugate, about 2 inches, or a shade less; sacro-cotyloid, about 1 inch. General condition of the patient fairly good; temp., 101° F; pulse, 104; mind cheerful; tongue clean and moist.

As the deformity, though great at the brim, affected the cavity and outlet of the pelvis to a very slight degree, I determined to attempt delivery by craniotomy and the other usual concomitants of that operation, though the extreme contraction of the brim prevented my being sanguine of success. Accordingly, though not without some difficulty, I perforated the skull, and removed the brain by a douche, then removed one parietal bone and portions of the other bones of the vault of the cranium, converted the case into a base presentation, and endeavoured, by successively seizing the base of the skull by the cranioclast, blunt hook, and guarded crochet, to pull it past the brim. But after a prolonged and patient trial I failed; and as the woman showed signs of exhaustion, pulse much accelerated and temperature rising, I desisted, and determined to perform Cæsarean section, which operation was begun shortly after midnight. The abdomen was thoroughly washed by an antiseptic lotion, with which also the vagina was well douched, and the patient put under chloroform. The peritoneum was opened in the usual way, and the incision made rather large, so as to admit of the uterus being brought out of the abdominal cavity, while the intestines and peritoneum were carefully protected by flat sponges, and the wound kept cleared as much as possible. I marked, by a slight transverse nick, what should be the extreme limits of the incision into the uterus. I then, midway between these points and in the middle line, cut rapidly into the uterine cavity, and enlarged the opening upwards and downwards by a

pair of strong scissors, my assistant meantime doing his best to prevent hæmorrhage by compressing the edges of the uterine wound between the fingers and thumbs of both hands. The child was then seized, and withdrawn with some little difficulty, owing to its head being held by the cervix. The placenta and membranes were then removed, and the cavity of the uterus thoroughly cleansed by sponges soaked in carbolized lotion, and finally some iodoform placed in the uterine cavity.

The uterine wound was then most carefully closed by many deep and superficial sutures, the peritoneum cleaned, and the abdominal wound closed by superficial and deep silk sutures, and dressed with iodoform, covered by oakum, and secured by a bandage. A subcutaneous injection of sclerotinic acid was then given and the following prescribed:—

℞ Liq. sodæ chlorin., . . ℥ss.
Aquæ, ... ℥ij.
Make a draught.
Every 4th hour.

℞ Quiniæ sulph., . . . grs. 2.
Opii, ... gr. ½.
Ext. gentian, q.s. . .
Make a pill.
Every 4th hour.

℞ Ext. ergot liquid, . . ℥j.
Aq. cinnamon, . . . ℥ij.
Make a draught.
Morning and evening.
Diet—barley water, milk, congie, ice.

May 11th, 8 A.M.—Pulse, 160, weak; respirations, 28; temp., 103°; tongue moist and clean; no marked tympanitis or tenderness; mental condition good. Continue treatment, and also give 5 grs. of quinine now and at 11 A.M.

1.30 P.M.—Condition less favourable; pulse exceedingly rapid; face anxious; much tenderness in hypogastrium; copious lochial discharge, just like the discharge from a stump; much thirst; temp., 103°·2 F.; respirations, 40; pulse, 160. Treatment continued.

12th, 9 A.M.—Temp., 102°·8 F.; pulse, 130; respirations, 36. The patient answers questions rationally; abdomen is tympanitic and tender; she has slight hiccough. On the whole seems a shade better this morning. Tongue clean and moist; bowels not moved; urine has been regularly drawn off by a catheter. Treatment continued.

6 P.M.—In much the same state.

13th, 8 A.M.—Temp., 102°·8; pulse, 126; respirations, 30. Seems a shade better this morning, or at all events no worse. Pulse and

respirations both rather less frequent; expression placid; tongue clean and moist; bowels not moved; urine drawn off regularly; sleeps occasionally. Bandage removed; womb found displaced to the right and under; tympanitis less; no vomiting; no hiccough to-day. Treatment continued.

4.30 P.M.—Temp., 102°·8 F.; pulse, 120; respirations, 40; breasts full; takes her food well. Treatment continued. Also applied belladonna plaster to breasts.

10.30 P.M.—℞ Potass. nit., . . grs. 10.
Tinct. opii, . . ♏ 20.
Spt. ether nitros., . ♏ 20.
Lq. menth. pip., . . ʒj.
Aq. ad., . . . ʒij.

14*th*.—Temp., 103°·4; pulse, 120; respirations, 36. Temperature is higher, but pulse is not quicker or weaker; tongue is clean and moist; belly rather more tympanitic, but not more tender; expression cheerful, and she looks no worse. Treatment continued. Also castor oil, ʒss.; intrauterine douche of liq. sodæ chlorinæ, 1–10.

4 P.M.—In much the same state. Bowels moved.

15*th*, 9.30 A.M.—Temp., 102°·8 F.; pulse, 114; respirations easy, 38. Looks rather better; tongue clean and moist; pulse of good volume; lochia not offensive; belly soft and not at all tympanitic; wound dry; uterus displaced to right, and some tenderness in hypogastrium and iliac region. Continued treatment (including douche). Enema of warm water.

4.30 P.M.—In the same state.

16*th*.—Looks better this morning; is quite cheerful; tongue clean and moist; temp., 102°·2; pulse, 112, of good volume; does not complain much of pain; belly soft and relaxed, and no tympanitis; wound appears healthy. Continued treatment.

17*th*.—In much the same state. There is some inflammation and suppuration along the suture tracts. Two sutures removed.

18*th*.—Better; pulse slowly falling; temp. keeps well; tongue clean and moist; urine rather hot; no peritoneal pain, but some of the sutures have caused suppuration, and this is probably the cause of fever. Sutures removed.

Uterus washed out with liq. sod. chlor. sol.

℞ Potass. nitrat, . . grs. 5.
Spt. ether nit., . . ♏ 20.
Decoct. cinchonæ, . . ʒj.
Every 4 hours.

19*th*.—Temp., 101°·3; pulse, 112 to 118; looks well; is quite cheerful; complains of a pain in the right side, but it appears to be superficial; wound looks better, but there is induration along

both sides of the incision; lochia scanty, not offensive, yellowish. Treatment continued.

26*th*.—Temp., 102°; pulse, 130; respirations, 32; not so well; pulse and temperature abnormal, but she *looks* well; tongue clean; expression cheerful; appetite good. Wound has healed except one point about size of a millet seed, on which there is a white deposit as if due to subjacent irritation; there is some suppuration in the abdominal wall, which escapes by three suture sinuses; below the cicatrix there is brawny induration, and this is, I suppose, the cause of the fever.

The rest of the case is simply a record of the treatment of some suppuration in the abdominal wall, which left a very obstinate sinus.

The patient was ultimately discharged on 31st July 1887 in good condition, but with still a small sinus at the upper end of the cicatrix. *Per vaginam* the uterus was displaced upwards, and is, I think, adherent to the parietal peritoneum at the seat of incision.

I do not think I have anything to add to the few remarks appended to the cases I formerly had the privilege of submitting to the Society. The point on which I am most anxious to elicit the opinion of the Society is this—What is the best operation when delivery cannot be accomplished per vaginam? Should it be such an operation as the one I now record, or something like Porro's operation, or the American extra-peritoneal operation? Cases of extreme deformity are not sufficiently frequent to enable one operator to make a comparative trial of these three operations, and it is probably desirable for one individual to adhere to one method and thus gradually accumulate material for comparison. For instance, it would be useless for me to do a Cæsarean section this year, a Porro next year, and a laparo-elytrotomy the following year.

At present my opinion is against Porro's operation, because it seems to me a much more formidable operation than Cæsarean section.

The operation now submitted for your kind consideration was performed with rather a bad light, and with assistants untrained in abdominal surgery. But I must express my cordial thanks to Mr Gallacher, the house-surgeon, for his steady and efficient assistance.

Professor Simpson said they had listened to the record of a very interesting case. He felt rather disposed to agree with Dr Arnott, especially after the success of Sänger and Leopold, that Cæsarean section is the operation to be preferred.

The President remarked that cases requiring Cæsarean section are so rare in this country that we are not in a position to give an opinion. The case recorded by Dr Arnott seemed to him (the

President) to be more suitable for Porro's operation than for Cæsarean section. Suppuration had evidently taken place in the uterine wound, and had caused the uterus to become adherent to the abdominal wall. He congratulated Dr Arnott on his success.

Dr Brewis thought that Dr Arnott deserved to be congratulated on his success, especially as the operation had been performed after craniotomy had been tried, and with the patient in an exhausted condition. He noticed that in enlarging the uterine wound Dr Arnot had used scissors, and that there had been considerable hæmorrhage. Dr Brewis had assisted the late Dr Macdonald at a Porro's operation, in which the uterine wound was enlarged by tearing the cut edges apart. There was little hæmorrhage. Dr Brewis thought that the ovaries should have been removed in Dr Arnott's case, to prevent the patient from becoming pregnant again.

Dr Martin said that the child should be taken into consideration as much as the mother, and in these days of advanced abdominal surgery Cæsarean section should be performed. The pregnant uterus, owing to its vascularity, was in a suitable condition for healing.

Dr Haultain remarked that suppuration of the stitch holes more frequently occurs after carbolic acid is used than after hot water.

Dr Rattray said that belladonna plasters are not desirable on the breasts. He has used Eau de Cologne and water for years with great success.

IV. CASE OF EXTRAUTERINE GESTATION.

By Albert E. Morison, M.B., C.M., M.R.C.S. Communicated by Dr J. W. Ballantyne.

Mrs I., æt. 30, mother of five children, eldest 12, youngest 3 years. First seen by my brother on 6th December 1887.

History.—She states that two years previously she had an attack of inflammation of the bowels, which her medical adviser said was brought on by cold during a menstrual period. This illness kept her in bed nearly three months. From that time up to two months from my first visit to her she had been well. She then menstruated normally, but had not been right since, having missed a period.

6th December.—She complains of periodic attacks of pain in the lower part of the bowels so severe as to confine her to bed.

On *13th December* she had considerable hæmorrhagic discharge from the vagina, and this, together with the severe periodic pain and the probability of pregnancy, aroused the suspicion of commencing abortion. She would not allow any examination to be made, so that it was impossible to form any accurate opinion.

The discharge continued more or less severe every day. The pains got worse and more frequent, and her general health began to fail from sickness, loss of appetite, and pain. The temperature during the last week has been 100° in the morning, 101° in the evening.

It was not till *24th December*, however, that she would allow any examination to be made, when, owing to her struggles and complaints, nothing very definite could be arrived at, though a soft tender swelling was found in Douglas's pouch.

On *28th December*, with the consent of her friends, she was induced to take chloroform, and the following condition of things was found:—

Per vaginam.—The uterus is enlarged, cervix soft and like a pregnant one. Behind the uterus is the swelling discovered on previous examination to be tender on pressure. It is rounded and elastic, and extends upwards to a point midway between the umbilicus and pubes. In front of it lies the uterus, the outlines of which can be clearly defined, distinct from but closely connected with the swelling.

The breasts contain colostrum, and there is a well-marked areola round the nipple.

After the chloroform she was very ill with pain in the præcordial region and shortness of breath, but nothing could be found to account for this.

29th December.—Dr Murphy of Sunderland saw the patient in consultation. He made a further examination under chloroform, and passed a uterine probe. His opinion confirmed that of my brother and myself, that it was a case of extrauterine pregnancy. The patient, however, was so ill we all agreed that to operate would kill her, and decided to wait for a few days and see if any improvement in her general condition could be brought about.

She improved somewhat by *2nd January* of this year, and on that day the following operation was performed:—The abdomen was opened in the middle line under the spray. The tumour was found to be covered in front with adherent omentum. It was adherent to the parietes below for the lower half, but on dividing the omentum was found to be free above. Since our last examination the tumour had increased in size and was now on a level with the umbilicus. On introducing the hand into the peritoneal cavity, it was closely adherent in Douglas's pouch and round the pelvic brim, making it improbable, even not taking into consideration its size, that the cyst could be shelled out. Accordingly the cyst wall was incised after packing the abdominal cavity with sponges. A terrific hæmorrhage followed, which was almost at once arrested by pushing a sponge firmly into the wound. To this the patient undoubtedly owes her life. The placenta was situated over the front of the cyst, and this it was which had been incised. The sponge was left in and the sac stitched to the

parietes. The operation was finished by suturing the remainder of the abdominal wound, leaving a drainage tube in the peritoneal cavity. The patient appeared to be little the worse for the operation and soon rallied.

3rd January.—Dressed under the spray. The sponge was gently removed from a sac between the placenta and membranes. Bleeding at once commenced, but was arrested by plugging firmly with gauze.

4th January.—Peritoneal drain removed.

5th January.—Bowels relieved with calomel (7½ grs.), followed by an enema.

6th January.—Plug of gauze removed and renewed. Very little discharge, no bleeding.

11th January.—As the temperature since the operation has been gradually rising, and patient complains of some pain, a hypodermic needle was pushed into the sac and withdrew fluid. A director was passed along the needle, and along the groove of the director a pair of dressing forceps. By opening the forceps and withdrawing them, the opening was enlarged. About a pint and a half of blood-stained fluid containing purulent flocculi and smelling like liquor amnii escaped, but no fœtus. The cavity was stuffed with gauze.

25th January.—In trying to remove a portion of placenta a sharp attack of hæmorrhage came on. Chloroform was given, the whole sac explored, and the fœtus (about two months) discovered and removed.

8th February.—The sac has gradually closed up, and the patient is practically well.

Professor Simpson said the result was an interesting one for abdominal surgery. It shows that the operation should be performed early. The thanks of the Society were due to Dr Morison for his valuable communication.

V. NOTES ON THE OBSTETRIC HISTORIES OF CATHARINE OF ARRAGON AND ANNE BOLEYN.

By Andrew S. Currie, M.D., Lydney, Gloucestershire. Read by the Secretary.

The subject of this paper is one of purely speculative and historical interest, and not one of practical obstetrics or of practical politics, though both these subjects enter into it. And yet I venture to think that its consideration will prove of some little use, both as tending to illustrate some points in pathology, and as throwing some fresh light on a knotty question in history, and thereby aiding in the settlement of a question which has caused the widest divergence of opinion between various historians.

Most people regard Henry the Eighth as a veritable Blue Beard —as a man of uxorious, certainly of lascivious, tendencies on the one hand, and of angry, passionate impulses on the other; as a man of strong and uncontrolled sexual instinct, who would stop short at nothing, who would not hesitate to commit crime, if necessary, to attain his desires, and who, having accomplished the gratification of his lust, soon became sated with conquest, and then was only anxious to rid himself of the woman who, once ardently desired, was now as passionately hated, and whom he was anxious to be rid of, under one pretext or another, and to supplant with indecent haste. To those who have held this view almost as a matter beyond dispute or cavil, Mr Froude's apology for Henry comes as a puzzling surprise. According to this able historian, and Henry himself could have selected no abler or more zealous apologist, the divorce of Catharine of Arragon was brought about, not by weariness of his wife, who was some years older than himself, and who does not appear to have possessed any very fascinating qualities either mentally or physically, nor by passionate desire for a young and beautiful woman, for, says Mr Froude, the king was past the heyday of his youth, and had reached an age when the conduct is ruled more by policy than by passion, but it was led up to in some part by religious scruple, and in large part by urgent reasons of State. Should the king die without male issue, and the succession thus devolve upon one frail female life, who in her turn might die a maid or early in life, or, if married, without heirs, there were not wanting claimants to the throne of England whose rival interests might renew the terrible experience of the wars of the Roses, or, more dreadful fate still from the English point of view, the hated Scottish nation might place a Stuart in the throne of the Tudors.

That it was eminently desirable in the interest of the Tudor line that Henry should leave heirs male lawfully begotten, that it would be to the interest of the English nation in no small degree, and that it was a matter of earnest desire by all parties in the State, no one can deny. I say of all parties in the State, for it would appear that the Countess of Salisbury and her adherents set up no claim to royal dignity on account of their Plantagenet descent, but were loyal to Henry as long as he was loyal to Catharine, and were even loyal to the Princess Mary when they had ceased to be so to Henry; and it was not till the rebellion of Exeter that the slightest sign was made on behalf of a rival English line.

Mr Froude tells us that Henry as a young man, considering the times and the temper of the times in which he lived, was remarkably free from sins of impurity. He had had one amour, it is true (which, by the way, though Mr Froude does not mention, or at least dwell on the fact, was of an adulterous nature[1]), the fruit of

[1] That is, it occurred after Henry's marriage to Catharine.

which was the Duke of Richmond; but beyond this one indiscretion we hear of nothing to his discredit in this way.

His father, Henry VII., from mercenary motives, had brought about the marriage between him and Catharine, who was not only his brother's widow, but was by several years his senior, yet he had, with the one exception I have named, remained faithful to his marriage bed. This supposition of Mr Froude's, that Henry had indulged in only one amour, is, I think, more than doubtful, and doubts are suggested, not by historical assertions, either well or ill founded, as to the existence of other intrigues, but by the obstetric histories of Catharine of Arragon and of Anne Boleyn, by the accounts we have of the general health of Henry's children, and by the history of the king's own health. That Catharine of Arragon bore several dead children is a point which is beyond dispute. All historians concur in admitting it. But another point in regard to Henry's first wife is of great significance. If we may trust Hume (and I venture to quote him in spite of Lord Macaulay's contempt for his trustworthiness[1]), we find that besides her being six years older than Henry, "Catharine, by the decay of her beauty, together with particular infirmities and diseases, had contributed, notwithstanding her blameless character and deportment, to render her person unacceptable to him. Though she had borne him several children, they all died in early infancy except one daughter; and he was the more struck with this misfortune, because the curse of being childless is the very threatening contained in the Mosaical law against those who espouse their brother's widow."

It may be well to state exactly the obstetric history of Catharine. This begins after her marriage with Henry. It is scarcely necessary to do more than refer to her previous marriage with Prince Arthur, for, assuming that Catharine was infected with syphilis, the infection must beyond a doubt have occurred after her marriage with Henry. In the first place, it is highly probable that the marriage with Prince Arthur was never consummated. Arthur was only fifteen, and a sickly lad, and though Henry VII. wrote to Catharine's father that he had risked his son's health by permitting cohabitation, he probably made this statement for State reasons. Catharine herself strenuously denied that her first marriage had ever been consummated; and even Mr Froude, who thinks that her denial was untrue, admits that she courted the fullest inquiry into this point. It may be well to add that Mr Gairdner, the latest writer on this subject, says,—"Although it is true that the young couple did go together to reside in the borders of Wales, it is clear, from the solemn declarations of Catharine herself

[1] If we may judge from some remarks quoted in Macaulay's *Life and Letters*, it does not seem uncharitable to say that that writer would appear to have looked with approval on only two historians, viz., Thucydides and Lord Macaulay.

long afterwards, that Prince Arthur never was her husband except in name. On 2nd April 1502, he died at Ludlow, a victim apparently to the sweating sickness, and Catharine was left a virgin widow." But, be that as it may, it is in the last degree improbable that Arthur was at all likely at his tender age to have contracted syphilis himself. So much for this part of the question.

Henry VIII. married Catharine on 11th June 1509, he being then 18 and his bride 24 years of age.

"On 31st January 1510," says Mr Gairdner, "Catharine was prematurely delivered of a stillborn daughter. On 1st January 1511, she gave birth to a son, who was christened Henry, declared Prince of Wales, and had a household assigned him, but died on 22nd February following. In 1513 she had another son, who soon died; and in November 1514 she had again a premature delivery. At last, on 18th February 1516, there came one child that lived—the Princess Mary; and in November 1518 another daughter was born, who must have died early." Thus there is a history of six confinements within a period of about nine years, one only of the children surviving more than a few months.

Before leaving for the present the history of Catharine, it should be mentioned that there has never been the faintest breath of suspicion against her moral character. She appears to have been a noble minded, virtuous, and eminently pious woman, although, perhaps, she was not fascinating. Unhappily, as we all know, the same cannot be said of Anne Boleyn, but even her guilt is open to very serious question. This is neither the time nor the place to discuss matters which are of purely historical interest, but it may be said that, although Mr Froude entertains no doubt of Anne's adultery and incest, Mr Gairdner says on this point,—"The evidence on which she was condemned, however it may have satisfied public opinion at the time, would probably not have impressed men in our day even with a general belief in her guilt, much less have justified her execution." This at any rate is certain, that on one occasion when Henry made an unworthy attempt to induce Anne to yield to his lust, she replied thus—"Most noble king, I will rather lose my life than my virtue, which will be the greatest and best part of the dowry I shall bring my husband."[1] This attitude of maidenly dignity and reserve she appears to have maintained at least till the eve of her marriage with Henry.

Henry married Anne Boleyn on 25th January 1533, and on 7th September in the same year Elizabeth, the future Queen, was born. In 1534 Anne miscarried, and on 29th January 1536 she was delivered prematurely of a dead boy. There is something terribly pathetic in Anne's behaviour after this misfortune. Chapuys, the Emperor's ambassador, quoted by Froude, tells us

[1] Miss Strickland's *Queens of England*, vol iv. p. 182.

that "she comforted the ladies who were weeping around her with telling them that perhaps it was for the best. The child which she had lost had been conceived in the late queen's lifetime, and there might be a question of its legitimacy. No uncertainty would attach to the next." In three years then Anne had been thrice pregnant, and only one child survived, that being the first. It is worthy of note that, shortly before the birth of Elizabeth, Anne complained to Henry because he had given her cause for jealousy, and was brutally told to shut her eyes "as her betters had done." This reference obviously was to Catharine, who had had similar cause for complaint in the matter of Henry's amour with Elizabeth Blount, and probably, according to Mr Gairdner, not on that occasion only, for, as that authority says, Henry was becoming a perfect libertine.

No obstetrician can, I think, fail to be struck with such a history as this, of repeated miscarriage in the cases of two successive wives, and it furnishes strong presumptive proof, according to our knowledge in the present day,—(1), That these miscarriages and premature deaths of Henry's children were due to syphilis on his part; and (2), That he, possibly through his children, infected Catharine with the same taint.

Playfair writes thus, — "Syphilis may unquestionably be transmitted to the fœtus without producing abortion, and at term the mother may be either delivered of a living child, bearing evident traces of the disease, of a dead child similarly affected, or of an apparently healthy child in whom the disease develops itself after a lapse of a month or two. These varying effects probably depend on the intensity of the poison."[1]

It is to be observed that, so far as we can know, neither Catharine nor Anne aborted. This is a very strong point in favour of my contention, viz., that Henry was the source of the infection, and that if Catharine acquired the taint (we know nothing as to Anne's fate in this respect) it was from her husband, and probably through the fœtus. Spiegelberg says that when "the mother is constitutionally diseased at the time of conception . . . the fœtus is usually expelled by abortion or premature labour, and is often macerated."[2] The same authority says that the mode of infection is worst where the mother is healthy, but the father is constitutionally diseased, although the maternal fluids appear to exercise sometimes a corrective influence, so to speak, and the children are born apparently healthy, although as a rule somewhat puny." Still stronger evidence in support of my contention is given in Bäumler's treatise.[3] This author says—"The researches of von Rosen and of Jonathan Hutchinson indicate that

[1] *Science and Practice of Midwifery*, 2nd edition, p. 264.

[2] *Text-Book of Midwifery*, New Sydenham Society's Translation, vol. i. p. 364.

[3] Ziemssen's *Cyclopædia of the Practice of Medicine*, vol. iii. p. 53.

the infection of the child is most commonly due to the father alone. E. Fränkel has also arrived at the same conclusion. . . ."

"This predominance of the paternal influence is such, that if the husband is healthy but the wife syphilitic, the probability of the succeeding offspring becoming gradually free from syphilis is greater than when, on the other hand, the wife is healthy and the husband syphilitic (Hutchinson). Further, the fact has been established by numerous observations, that a man who at the time is apparently free from disease, or has been so for a number of years, but at some former time was syphilitic, is still capable of transmitting syphilis to the child he begets."

The same doctrine is taught by other writers, among others by Dr Robert J. Lee in an essay in the 3rd volume of the *Archives of Pediatrics* ("Infantile Syphilis—the Relation between Conditions of the Offspring and Parental Antecedents"); and by Neumann of Vienna in the *Archiv f. Kinder.*, Bd. 7, H. 3; but enough has been said on this point.

I will now revert for a moment to the description given by Hume of "the decay of Catharine's beauty, together with the particular infirmities and diseases which had rendered her person unacceptable to her husband." Was this due to her own infection or not? We cannot say positively, but possibly it was so. Hume's description would fit in with the remarks of Bäumler. "The syphilis poison evinces a very peculiar modification of its action *when it operates through the fœtus, procreated by a father affected with latent syphilis, upon the pregnant mother.* Women that go through a number of such pregnancies begin gradually to suffer an impairment of health without ever being infected in the ordinary way. A modified infection ensues, etc." He then enumerates various symptoms, such as gradually increasing pallor and emaciation, alopecia, etc.[1] It is to be remembered, however, that, as Dr Norman Moore has shown, Catharine died of melanotic sarcoma of the heart, and this may have run a long course.

Of Henry's children who survived beyond infancy we have tolerably full details. His illegitimate son Henry Fitzroy, Duke of Richmond, died at the age of 17.[2] He was a boy of singular "beauty and noble promise," but "he too passed away in the flower of his loveliness, one more evidence of the blight which rested upon the stem of the Tudors." Elizabeth seems to have enjoyed good health, but the same cannot be said of Mary. Froude thus describes her appearance at the age of 36. "Her face was broad, but drawn and sallow; the forehead large, though projecting too much at the top, and indicating rather passion and determination than intellectual strength. Her eyes were dauntless, bright, steady, and apparently piercing; but she was short-sighted, and insight into either character or thing was not among

[1] *Loc. cit.* p. 55.
[2] Froude's *History*, vol. i. p. 389.

her capabilities. She was short and ill-figured; above the waist she was spare, from continued ill-health; below, it is enough to say that she had inherited her father's dropsical tendencies, which were beginning to show themselves."[1] This description is, to say the least, not incompatible with inherited syphilis, especially when viewed in the light of her mother's obstetric history, and it may fairly be asked whether the short-sightedness was not really the outcome of interstitial keratitis. Edward's pitiable history is well known. He was delicate complexioned, he was unnaturally precocious, had a projecting forehead (somewhat like his half-sister Mary in this respect), was narrow-chested, and generally constitutionally delicate. He suffered from frequent cough, and occasionally from hæmoptysis. Before his death he suffered severely from skin eruptions, from falling of the hair, and from some affection of the nails. Here, however, it is to be observed that some old woman treated him immediately before his death, and it is possible that in her ignorance of drugs she administered poisonous doses of some mineral, perhaps arsenic, but this is mere surmise. Let us now contrast the portraits of Henry's children that have come down to us with the picture which Barth draws of delayed hereditary syphilis.[2] (1.) Backwardness in general development, and debility at the age of puberty. Both the Duke of Richmond and Edward VI. died at the age of puberty.—In girls the breasts are poorly developed.—This appears to have been the case with Mary. (2.) Deformities of the cranium are frequent, the brow may be abnormally large, and the forehead square.—Squareness of the forehead existed both in Edward and Mary. (3.) The nose may be thickened and broad, and there may be a deep depression at its root.—Mary's nose appears to have at least approached this type. (4.) The eyes may suffer as to the cornea, there may be synechiæ, etc.—Mary's eyes were undoubtedly affected in some way. There are many other phenomena described by Barth, but only one more shall be quoted, viz., there are frequently affections of the larynx.—Mary had a harsh, grating, strident voice, which was said to be like a man's.

It is not fair to lay undue stress on the affections of the skin, nails, and hair, from which Edward suffered before his death, because they may have been the outcome of mineral poisoning.

We have, lastly, to consider the question of Henry's own health. In early life he was constitutionally strong and vigorous. In middle age he began to suffer from weakness, tendency to obesity and anasarca, and ulcers. The ulceration appears to have shown itself first during the life of his fifth queen, Catherine Howard, but after his marriage with Catherine Parr it became inveterate. Had Henry lived in an age of greater medical enlightenment, it is probable that his sufferings would

[1] Froude's *History*, vol. v. p. 29.
[2] *Jahrbuch. f. Kinderh.*, B. xxi. H. 3.

have been relieved, his dropsy removed, and his ulcers healed by a course of iodide of potassium.

I may be permitted here to allude to Mr Froude's contention on behalf of Henry, that his life had been singularly free from offences against morality. "The history of the reign of Henry VIII.," says that historian, "is a palimpsest in which the original writing can still be read." This remark may well be applied to his moral and medical history. In spite of the adulatory comments of contemporary sycophants, and in spite of the glosses of later historians, we can read the original writing.

Let us take Mr Froude's argument, and see how it accords with the facts. He writes thus,—"In nine years two queens of England had been divorced and two had been unfaithful. . . . For such a combination of disasters some common cause must have existed, which may be or ought to be discoverable. The coarse hypothesis which has generally been offered, of brutality and profligacy on the part of the king, if it could be maintained, would be but an imperfect interpretation; but, in fact, when we examine such details as remain to us of Henry's relations with women, we discover but few traces of the second of the supposed causes, and none whatever of the first. A single intrigue in his early years,[1] with unsubstantiated rumours of another, only heard of when there was an interest in spreading them, forms the whole case against him in the way of moral irregularity. For the three years that he was unmarried after the death of his third wife, we hear of no mistresses and no intrigues.[2] For six months he shared the bed of Anne of Cleves, and she remained a maiden. . . . The vigour of his youth was gone. His system was infirm and languid."

Contrast this view of the case with the following facts. Henry cruelly neglected Catharine; he endeavoured to seduce Anne Boleyn, and only began to think of a divorce from Catharine when his purpose was baffled by Anne's resistance; his letters to Anne before their marriage (which have recently come to light in the Vatican) are lewd and filthy to a degree; he was notoriously in love with Jane Seymour long before he accused Anne of adultery; and it appears evident that he would have seduced Jane Seymour if he could—in fact, her friends thought it necessary to warn her. I say nothing of his marrying his third queen the day after the murder of his second. When a man has passed 50, and when, as we are told, "the vigour of his youth is gone, and his system is infirm and languid," temperance ceases to be a virtue, because it is a necessity. The facts, then, all tell against Henry's virtue and temperance, at least during the vigour of his manhood.

On the other hand, it is pleasant to believe that Henry was of

[1] Henry was 28 at the date of this intrigue.

[2] This is not such a striking instance of temperance. Henry was 46 when Jane Seymour died.

far different temper and disposition in his later years. His grief on the discovery of Catherine Howard's crimes was profound and genuine. From this time, indeed, down till the time of his death he appears to have been of a more kindly and gentle disposition. On his deathbed, according to one author, he was tortured by remorse for the murder of Anne Boleyn; and, according to another, he was haunted with visionary horrors, and kept muttering to himself, "Monks—monks!" Who can tell whether he was not thinking of those saintly men whom he had driven from the Charterhouse to the scaffold or into exile—thinking of them with penitent sorrow? He could not fail to think with bitter regret of his relentless wrath, which, to use Homer's words,—

"Πολλὰς δ' ἰφθίμους Ψυχὰς Ἄϊδί προϊαψεν
Ἡρώων."

We may say of him what the pious King Henry VI., in Shakespeare's play, says of Cardinal Beaufort,—

"Peace to his soul, if God's good pleasure be!
Forbear to judge, for we are sinners all.
Close up his eyes, and draw the curtain close;
And let us all to meditation."

The President said the paper was not one that could be discussed historically. It showed that Henry VIII. had syphilis; and from the obstetric history of the two queens it was probable that they had syphilis communicated to them.

VI. ON THE EFFECTS OF COMPRESSION OF THE FŒTAL SKULL, WITH SPECIAL REFERENCE TO DELIVERY IN MINOR DEGREES OF FLAT PELVIS.

By R. Milne Murray, M.A., M.B., F.R.C.P.Ed., F.R.S.E., Lecturer on Midwifery and the Diseases of Women, Edinburgh School of Medicine.

One morning some years ago I was asked by two students of the Western Dispensary to see a woman in labour on whom they had been in attendance all night. I found the parts hot and tender, the waters drained away, the head transversely at the brim, and both fontanelles within easy reach. The child was alive, but the woman was irritable and exhausted. The membranes had broken ten hours previously. On inquiry I found that this was her third pregnancy. On the first occasion the child was born dead and premature; on the second, Dr Angus Macdonald had delivered her of a dead child. The mechanism was that of a flat pelvis, and had one seen and recognised the condition at an earlier period, the propriety of turning would scarcely have been questioned. As it was, the wisdom of this form of interference was not so plain. The head was caught in the brim, and the waters

had largely gone. Moreover, I had recently produced a modification of the Tarnier-Simpson forceps, and was naturally eager to test their efficiency. I applied the instruments without difficulty, save that the locking was troublesome; the whole length of the fixation-screw was required to give them a hold. The left blade lay right over the occiput, the right over the sinciput, and the occipito-frontal diameter crossed the axis of the instrument at a right angle. When I saw the widely-separated handles, I was impressed by a wholesome dread of the risk of the instrument slipping, and accordingly I commenced traction with caution and circumspection. I had made comparatively slight efforts when, to my surprise, the head began to come down, and in a very short time delivery was effected. When the head reached the vulva the antero-posterior grip of the instrument was plainly seen.

Shortly afterwards I mentioned the case to Dr Macdonald. He recollected the woman, and had been asked to see her when labour was advanced; had tried to deliver by forceps, but failed; and delivered a dead child by turning. Some weeks later I had in private practice a case of a primipara whose mechanism showed every evidence of a flat pelvis of the minor degree, and in whom I delivered the fœtus by means of the axis-traction instrument with comparatively little difficulty. The question, accordingly, arose in my mind, Why was it possible to deliver this woman with a minor degree of flat pelvis by means of the axis-traction forceps when the other forms failed, and why did the older form fail?

It is not necessary for me to discuss here the mechanism of labour in a flat pelvis, but I may remind you that the transverse diameter is roomy, while the conjugate is contracted. The head is thus caught in its transverse diameter, while its antero-posterior diameter has comparatively abundance of room. This being so, it is easy to apply the blades to the occiput and sinciput of the child, but well-nigh impossible to adapt them obliquely or transversely to the head—that is, in the oblique or conjugate of the pelvis. The difficulty of delivery by means of the forceps in flat pelves, then, has been attributed, apart from the difficulty of locking the instrument, to the supposition that the compression in an antero-posterior direction by the forceps blades resulted in a corresponding widening of the transverse diameter of the head, which, already caught in a narrowed conjugate, became more firmly locked in this diameter.

A reference to the standard text-books shows how widely accepted this view of the action of the forceps is. They all agree, more or less accurately, as to the mechanism developed by the compression of the forceps.

"The reason," says Schroeder,[1] "why we do not recommend the forceps in these cases is the following:—The head enters with the

[1] *Manual of Midwifery* (English edition), p. 59.

sagittal suture in the transverse diameter of the contracted pelvis. But when the head is high up, the forceps can only be applied in the transverse diameter of the pelvis, and consequently the blades must grasp the forehead and occiput. . . . The forceps applied in this way would also compress the longitudinal diameter of the head, and this compression would increase the pressure to which the maternal soft parts are already exposed, from the head lying between the promontory and the symphysis. It is evident, also, that this enlargement of the head in the transverse diameter would render its passage through the contracted parts still more difficult."

"The forceps," says Lusk,[1] "applied in the transverse or oblique diameter of the pelvis prevents the former compensation from taking place. It increases the width of the head, and this adds to the difficulty of passing the conjugate."

In his elaborate paper on labour in deformed pelvis, Goodell[2] says,—"The fronto-occipital compression to which the head is subjected not only prevents the natural lengthening out of the long diameter, but it causes bulging of all the cross diameters."

But if this bulging of the cross diameters of the head were the case in the use of the older instrument, it must also be the case with the axis-traction forceps, whatever pattern may be employed. To permit of traction a certain amount of compression must be applied, and consequently the locking of the transverse fœtal diameter in the maternal conjugate diameter, if it occurred with the older pattern, must likewise occur with the new. It seems clear *a priori* that this widening of the diameter could not explain the difficulty of delivering such cases with the older instrument, and it seemed proper, before going further in the study of this matter, to investigate accurately the nature and amount of the changes which do occur when the fœtal head is grasped by forceps in an antero-posterior direction. To determine this point a very simple method of experiment was adopted.

A recently-delivered fœtus was taken, the centre of the parietal boss on either side was marked by means of a pin, which was pushed through the bone, and in a similar fashion were marked the bi-mastoid and bitemporal diameters. This enabled measurements to be taken from the proper points with great accuracy, when the head underwent compression and distortion during the course of the experiment.

A cephalotribe was then placed with its blades accurately applied on the occiput and sinciput, and the screw brought up until the blades were just in contact with the head, but were not compressing it in any way. The distance between the outside surfaces of the blades was then carefully measured by means of callipers,

[1] *Science—Art of Midwifery*, p. 475.

[2] "Labour in Narrow Pelves," *Trans. of Internat. Med. Congress*, Philad., 1876, p. 787.

and noted. This is termed in my notes and the tables the "occipito-frontal diameter," but of course it includes the thickness of the blades as well. Thereafter, by means of the callipers, the transverse cephalic diameters were measured and noted in a similar fashion. In this way the normal dimensions of the fœtal head were obtained.

The compression-screw of the instrument was now turned until a manifest reduction of the occipito-frontal diameter had taken place. The four diameters were then measured and noted, and the same procedure repeated two or three times, until the bones began to show signs of giving way under the compression.

The observations were repeated on nine fœtuses of varying degrees of development. I have not thought it necessary to do more than give the details of two cases (being the first and the last of the series), because all the experiments give almost identical results.

I. A fully-developed child delivered by the breech, died during delivery. Observation made day after birth.

Names of Diameters.	Before Compression.	After Compression.		
		I.	II.	III.
Occipito-frontal, .	4⅜	4	3⅜	3
Bi-mastoid, . . .	2⅜	2⅜	2⅝	2⅝
Bi-temporal, . . .	3	3	3	3
Bi-parietal, . . .	3⅜	3⅜	3⅜	3⅜

From this table it will be seen that the successive compression reduced the occipito-frontal diameter by half an inch each time, the total reduction from 4½ inches to 3 inches, a loss of 1½ inch, or 33 per cent. Yet it will be seen that, in spite of this very great reduction, the transverse diameters underwent hardly any change. Thus the bi-temporal remains absolutely constant, while the bi-parietal increases by ⅛ inch at the second compression, losing this again on the third compression. The bi-mastoid, again, remains quite constant during the first compression, but increases by ⅛ under each of the successive compressions, in this way gaining ¼ inch, while the occipito-frontal lost 1½.

I should note that the amount of compression exerted at III. was sufficient to affect the contents of the skull to such an amount that the left eye bulged out of its socket, representing a degree of force far greater than could be applied by an ordinary pair of forceps.

II. The ninth experiment was made on a fœtus slightly under-

sized, which died during delivery from asphyxia, the cord being round the neck and the mother unattended at the time. The arrangement of the experiment was identical with the first, and the observations were made in the same way.

Names of Diameters.	Before Compression.	After Compression.	
		I.	II.
Occipito-frontal, .	4⅜	3⅝	3⅝
Bi-mastoid, . . .	3	3	2⅝
Bi-temporal, . . .	2⅝	2⅝	2⅝
Bi-parietal, . . .	3⅝	3⅝	3⅝

Two stages of compression were employed, the first reducing the occipito-frontal diameter by ⅝ inch, the second by ⅛ inch more. Here the bi-mastoid and bi-temporal remain constant, while the bi-parietal gains ⅛ inch in the last stage.

As I have said, all the other experiments give almost identical results—absolutely identical in the absence of transverse increase, with a moderate amount of antero-posterior reduction, and almost identical in the minute amount of increase of these diameters under extreme and mutilating degrees of reduction.

The mechanical explanation of this interesting result is not difficult. The idea that diminution of the occipito-frontal diameter of the fœtal head must be accompanied by a corresponding increase of the transverse diameters, arises from the conception of the fœtal skull being a continuous elastic box, the mechanical relation of which might be represented by a continuous oval elastic ring. If such a ring, constructed, for example, of watch-spring, is compressed along one axis, it will of necessity expand along another. And if this represented the structure of a transverse section of the fœtal skull, it is obvious that compression of the long (occipito-frontal) axis must result in widening of the shorter (bi-parietal, bi-temporal). But, as we all know, the fœtal skull is built up of a number of segments so arranged that the anterior and posterior ones may slide under the intermediate one. This, then, is exactly what happens in the case under consideration. The occipital and frontal bones under the compression of the forceps slide under the posterior and anterior borders of the parietal bones, and in this way the head becomes "telescoped" from before backwards. Thus the head lends itself readily to antero-posterior shortening without any mechanical necessity for transverse bulging, so far as the segment under consideration is concerned.

But the question at once arises, What during this process of compression happens to the contents of the skull; how do they accommodate themselves to the diminished space?

It may safely be assumed that these contents are practically incompressible, and that if their containing space is limited in one direction a corresponding expansion must be found for them elsewhere. This expansion is undoubtedly provided by an elongation of the skull in a vertical direction, directly proportioned to the antero-posterior compression.

The approximation of the occipital and frontal bones, resulting as it does in an increased intracranial pressure, is followed by the elevation of the parietal bones, so that these tend to move away from the occipital and frontal bones, leaving a distinct space between the upper surface of the latter and the under surface of the former. If the head is caught between the forceps in a position half-way between flexion and extension (as will be the case when they are applied in a flat pelvis), both ends of the parietals will be equally elevated; and if in a state of flexion (as in a justo-minor pelvis), then this elevation will chiefly affect the posterior end of the parietals. The parietal bones thus ride upon the cerebral contents like a saddle, and it is due to the mobility of these bones that the cerebral contents find accommodation when the antero-posterior diameter has been diminished by compression.

This vertical elongation was described long ago by Chassagny, and was regarded by him as of vital consequence in delivery of the head by forceps. To permit of its taking place without difficulty, he devised the forceps with which his name is associated, in which the blades are parallel and not crossed, so that the elongating head might meet with no obstruction at the crossing of the blades, as in the ordinary instrument. A modified form of the same elongation is seen in cases of persistent occipito-posterior position, when the long-continued compression of the skull at the level of the parietal bosses is followed by the familiar sugar-loaf appearance of the head.

A moment's consideration will show that the application of the compressing instrument in any diameter other than the antero-posterior will be followed by totally different results. For example, if the grasp is an oblique one,—that is, one blade over, say the right half of the lambdoidal suture behind, and the other on the left frontal bone,—the effect of compression will be distortion of the head, producing a lengthening of the free oblique diameter (*i.e.*, from the left half of the lambdoidal to the right frontal bone). This lengthening of the free diameter will be nearly proportional to the shortening of the compressed diameter, and such an effect will materially increase the difficulty of the passage of the head through a narrow conjugate. The "telescopic adjustment" is in such a case entirely lost; its occurrence depends on the compressing force of the instrument being applied in a line coincident with the antero-posterior diameter.

While the experiments detailed were made by means of the

cephalotribe, the same results can be obtained by means of the forceps, though compression can be effected by the latter instrument to a smaller degree. The former instrument was employed because much greater compressing force could be applied by its use, and the results of such force more easily demonstrated. The broader blade of the forceps in no way alters the manner in which the occipital and frontal bones glide under the parietals, while the transverse distance between the last-named bones remains constant.

From these observations we may safely make the following deductions:—

1. The fœtal skull is compressible in an antero-posterior direction by the sliding of the occipital and frontal bones under the ends of the parietal bones.

2. This compression is not accompanied by any appreciable increase of the transverse diameters.

3. The antero-posterior shortening is compensated for by a vertical elongation of the skull, the parietals tending to move away from the frontal and occipital bones. This provides for the accommodation of the cranial contents.

In conclusion, let us consider very briefly what practical bearings these observations have.

First, They appear to me to show that the failure of the older forceps to effect delivery in minor degrees of flat pelvis was not due to bulging of the transverse fœtal diameters and consequent jamming of the head, because, in the first place, this would occur as much with the axis-traction as with the older forceps; and, in the next place, this bulging (as these experiments show) does not occur at all.

Accordingly, we must look for the explanation of the success of axis-traction and the failure of the other in the fact that by the former we are able to pull upon the head to a greater advantage, that is, we can apply traction nearer the true axis of the individual pelvis. The error of the older form in the normal pelvis is greatly increased by the special features of the flat pelvis—altered inclination and abnormal axis.

Second, These experiments give us an added assurance in dealing, by means of the forceps, with these cases of undoubted flat pelvis and flat mechanism where the head has partly engaged, this fact showing that the difference between the fœtal and maternal diameters is one of minor degree. In such cases we may hope that, by a reasonable amount of traction, the head may be safely brought past the obstruction. In such cases we need not be troubled with the fear that the application of the forceps to the extremities of the child's head will increase the complications by the conjugate diameter. A minor pelvic defect of this sort may frequently yield to traction with the forceps, provided that traction is applied in a proper direction, *i.e.*, in the axis of the brim. In this way the

undoubted risks of turning may be avoided in many cases where, without this instrument, turning was unavoidable.

I hope it is clearly understood that I am advocating the use of the forceps only in the *minor* degrees of flat pelvis. The limits of safe forceps delivery has been fixed at different points by different authorities in relation to the conjugate at the brim. I believe that with the axis-traction forceps the limit has been extended, that is, we may now safely deliver a head through a smaller conjugate than we could with the older instrument. What this limit is it is not easy to define. I believe each case gives its own indication, and I should say that the forceps may be employed with reasonable assurance of success in all cases where the head has engaged, its having engaged being an indication that the disparity between the maternal and fœtal diameters is not great.

And here let me say, with all emphasis, that the advantage this instrument gives, as compared with the older, is that we can apply traction in a direction more coincident with the pelvic axis than was possible with the other, and in no sense does this advantage lie in their giving us a means of applying more power in the process of extraction. Their virtue lies in thus enabling us to deliver *suitable* cases with *less*, because with *better directed* force—not that they permit us to deliver *unsuitable* cases by the use of *additional* force. The fact that more power can be transmitted to the pelvis and head by them than by the old forceps is a distinct and definite disadvantage, and in the hands of the careless or unskilled renders them a most dangerous and pernicious machine.

I have often shuddered when, on showing them to a robust and able-bodied practitioner, I have seen him grasp them with both hands, working the rods up and down, and exclaim. "What a capital instrument; what a power you have with them!" In such hands, stimulated with such a conception of their object, the possibilities are appalling.

The axis-traction forceps is in reality a diagnostic as well as a therapeutic instrument. It enables us to determine the safe limits of attempts at delivery by this means. We can apply the force in the best direction, and if a reasonable amount of such force is not sufficient to effect delivery, we ought to recognise that some other means must be adopted.

If these facts were kept in mind, we should hear less frequently about laceration of the perineum and other accidents often attributed to the use of this instrument—accidents only too frequently due to its abuse.

Thirdly, These observations show that it is of the greatest importance that in all cases the blades of the forceps should be applied as near as may be over the extremities of the presenting antero-posterior diameter. It is only by compressing the head directly from before backwards that the full mechanical advantage of the "telescopic compression" can be obtained. The advantage is

greatly lost in an oblique grip, and though this is unavoidable in many cases, it should be avoided, if possible, in all cases where the head is at or above the brim. In cases of flat mechanism, where the occipito-frontal diameter presents in the transverse, the two blades should lie at the extremities of the transverse diameter; but in cases of justo-minor pelvis the head usually presents in the oblique, and, accordingly, the forceps will act to the greatest advantage if applied at the extremities of the same oblique at the brim. If applied in such a case in the transverse at the brim, they will grasp the fœtal head over one-half of the lambdoidal suture behind, and over the opposite cheek and half of the coronal suture in the other aspect. Such an asymmetrical grasp as this will undoubtedly give rise to distortion, interfering with the "telescopic adjustment" which I have indicated, and in this way materially increasing the difficulty of delivery.

The President thanked Dr Murray for his important paper, in which was demonstrated a fact which upsets old theories, viz., that by compressing the fœtal head in its antero-posterior diameter you do not enlarge the transverse. The opposite of this view is stated in all the books. The practical difficulty is that in nearly all cases you do not get an exact antero-posterior grip with the forceps, but an oblique one. The paper was one of the greatest merit.

Professor Simpson said the paper was valuable and interesting. He had always had the impression that antero-posterior compression was dangerous. Certainly it was so with the older instruments, which indented the skull. It was important to be sure that the same result is got with forceps as with the cephalotribe. He considered axis-traction forceps safer than the older ones, as with the former we make only sufficient pressure to get the grasp, while with the latter considerable force is exerted in order that they may be kept on the head.

Dr Murray thanked the Society for the reception given to his paper. He did make comparative investigations with different forceps, and got the same results. Former experiments of the same nature were made, more to test the effect of compression on the contents of the head than to determine the changes effected on the shape of the head. His experiments, on the other hand, took no account of the former effects, but were solely directed to the latter.

MEETING X.—JULY 11, 1888.

Dr UNDERHILL, *President, in the Chair.*

I. *Dr Brewis* showed (*a*) a SOLID OVARIAN TUMOUR of large size which was infiltrated with lime salts; (*b*) DISEASED UTERINE APPENDAGES.

II. *Dr Foulis* asked the President's permission to mention to the Society that he had recently met with a patient who belonged to a remarkably PROLIFIC FAMILY. Her grandaunt had triplets, her mother and one of her sisters had twins, and her eldest sister had twins three times.

III. DEMONSTRATION OF THE ACTION OF GALVANIC CURRENTS ON TISSUE, by *Dr Milne Murray.*

Dr Foulis brought before the Society the fact that the negative pole may be dangerous on account of its wide electrolytic action, which may cause sloughing. He would like to hear from Dr Murray whether, in his experience, he had found that metritic effusions are acted on by the current. Keith asserted that in large thickened uteri absorption took place under the influence of galvanism.

Dr David Smart mentioned the case of a tumour which was perforated through the posterior fornix by the negative pole with a fatal result, and at the post-mortem examination a large slough was found.

Dr Milne Murray did not believe that there existed any physical possibility of "charging" a patient with electricity, as had been supposed by several experimenters. The phenomena described by them as proving this were simply the result of well-recognised phases of polarization. He illustrated this by means of a diagram. The so-called interpolar action was no more possible in a tumour than in a salt solution. The negative pole, when introduced into the substance of the tumour, was undoubtedly more efficient, but he agreed with Dr Foulis that its action in this way was by no means free from danger; and every precaution should be taken to avoid the risks, septic and other, attending this procedure. The mucous membrane offers little or no resistance to the passage of the current, and consequently the poles will necessarily produce their respective effects on the tumour if in contact with it, though to a less extent than when actually embedded in its substance. With regard to the treatment of inflammatory effusions, Dr Murray mentioned the case of a patient whose pelvis was roofed in with perimetric deposit, who was treated with the positive pole inside and the negative outside, and that after twenty-six applications the swelling entirely disappeared.

IV. CASE OF ACUTE PHTHISIS WITH LARGE CAVITIES IN AN INFANT NURSED BY A PHTHISICAL MOTHER.

By John Thomson, M.B., C.M.

On 29th January 1887 I was called to see an infant of 9 months (R. G.) with an ordinary sharp attack of vomiting and diarrhœa. I examined his lungs carefully, and they seemed perfectly normal; there was no dulness, no crepitations, no acceleration of breathing. The vomiting and diarrhœa were easily checked, and in six days he had returned apparently to his usual, not very robust, state of health.

On 5th March (five weeks after I first saw him) I was again asked to see him on account of cough, wasting, and fretfulness, and was told the following history:—

History.—With the exception of the above-mentioned illness and an occasional short cough, he had always been quite healthy since birth, though never robust. His mother, who was suffering from phthisis when he was born, nursed him for six and a half months, then weaned him, because she was so weak, and died in the Infirmary a fortnight later. She had not at any time sores on the nipple or breast, nor anything else the matter with them. (This was confirmed by the nurse who had attended to her in the Infirmary.) She was frequently found fault with by the relative who nursed her at home for coughing "right into the baby's face." After he was weaned, the child was given cow's milk, and seemed to have been carefully and well looked after. The cough, etc., had begun three weeks before, *i.e.*, one week after he recovered from the gastro-intestinal attack.

Family History.—He was an only child. His father was healthy, and gave no family history of phthisis. His mother's mother, brother, and two sisters had died of phthisis, and two other sisters were suffering from it.

Condition on Examination.—He was a tolerably well-developed child, though pale and thin. His head was held slightly, but persistently, a little backwards and to the left side. The breathing was very rapid. The thorax was well formed, and neither here nor elsewhere was there any sign of rickets. The right apex was quite dull on percussion above the level of the third rib anteriorly, and to a corresponding extent behind. The breath-sounds were intensely bronchial, and there were numerous coarse crepitations. The rest of the right lung and all the left seemed quite normal. The abdominal organs and heart were normal. The temp. (in rectum) 98°·8.

Progress.—I saw him repeatedly after this, and he rapidly got worse. A week after (12th March), the dulness and other morbid signs had spread considerably downwards, and were very marked in the right axilla and interscapular region. Temp. 102°·5.

On the 14th, the breathing at the right apex was cavernous, and the crepitations had a metallic sound.

On the 22nd, he was much wasted and distinctly cyanotic. Pulse, 184; resp., 72; temp., 103°·3. His head was more retracted than formerly. He was sweating a little. There had been no diarrhœa, and the cough was not at all severe. Owing to his weak state, his left lung was not examined.

On 25th March he died.

I had to leave town the day before his death, and the post-mortem was kindly performed for me by Drs Wm. Hunter and Geo. Mackay.

Post-Mortem Appearances.

Right Lung.—One-third of an inch from the root of the right lung, at the junction of its upper and middle lobes, there is a large oval cavity, which reaches to the pleural surface. It measures $1\frac{3}{4}$ inches from above downwards, and $1\frac{1}{4}$ inches from side to side. The walls are sloughy and ragged, with numerous bridges of tissue, and it contained a large quantity of pultaceous caseous material. It is surrounded on all sides by numerous smaller cavities which communicate with it. The apex of the lung is almost entirely taken up by three separate cavities, varying in size from a bean to a large hazel-nut, and resembling the larger one just described in character and contents. The rest of the lung is filled with caseous patches, and numerous smaller cavities, with the exception of the anterior 2 inches of the middle lobe, and the posterior two-thirds of the lower lobe, which are almost unaffected.

Left Lung.—There is a cavity the size of a hazel-nut situated near the root. At the apex there is another about half that size; and throughout the rest of the lung there are more than a dozen others larger than a pea, and many more smaller ones.

There was a considerable amount of recent pleurisy, especially over the large cavity on the right side.

The bronchial glands were much enlarged, and entirely converted into pultaceous caseous matter.

In the liver there were a few caseous patches with soft centres, some of which were the size of a pea. Round these, tubercles were seen on microscopic examination.

No further evidence of tubercle was found in the abdomen, and the other organs appeared normal on naked-eye examination.

The brain was not examined. This is unfortunate, as the persistent head retraction pointed to intracranial disease.

Remarks.—The case is an interesting one, both from a clinical and pathological point of view. Although tubercle is so extremely common in infancy, the occurrence of phthisis with large cavities is very rare indeed. I would draw attention to three points:—

1. The extraordinary rapidity with which the disease progressed. Eight weeks before death, no abnormal physical signs were dis-

covered on examining the lungs, and the breathing was not accelerated. So that, although there may probably have been a considerable amount of tubercle in the thorax when the child was first seen, there cannot have been any extensive consolidation present in the lungs at that time.

2. The absence or slightness of several symptoms characteristic of the disease in adults, such as hæmorrhage, diarrhœa, cough, and sweating.

3. The position of the largest cavities at the root of the lung is, I believe, characteristic of this disease in infants.

With regard to the possible mode of infection in this case, it is interesting to put side by side—(1), the absence of any morbid condition of the mother's breast or nipple, and the very small amount of disease found in the child's abdominal organs; (2), The fact that the mother was frequently found fault with for coughing in the baby's face, and the enormous extent to which the respiratory system was affected.

The President said the thanks of the Society were due to Dr Thomson for his interesting paper. The theory that phthisis can be communicated directly has been recently proved, and we have more reason to consider Dr Thomson's case one of direct infection than of inheritance of tubercle. In inherited cases we are sure to find tubercle in other organs. The high percentage of tubercle present in children who die before nine months was pointed out in a Russian medical paper which he (the President) had lately read.

V. CYSTIC DISEASE OF THE OVARIES.

By J. W. Martin, M.D.

The frequency with which the operation of removal of the ovaries at the hands of the gynæcologists is carried out in these days of laparotomy has called forth the very serious attention of workers in the profession to the study of the pathology and diseased conditions demanding the removal of these all-important organs. It goes without saying that the existence of a large ovarian tumour occupying space within the body, and sprung up to the detriment and destruction of the ovary, and with ever-increasing danger to the life of the individual, should be extirpated, and this is the operation of ovariotomy. It dates from the successful attempt of MacDowell of Kentucky, U.S.A., who in December 1809 removed a large ovarian tumour from Mrs Crawford, and the operation is at once an epoch in the history of Gynæcology, and one of the greatest achievements of this age. The incalculable benefits which this operation, rightly or wrongly so called, has bestowed upon the human race necessitates it being carried out in

every case *cæteris paribus*. But that a large number of ovaries and tubes are now removed by gynæcologists, without being markedly changed, though for severe symptoms set up in the individual, demands that the exact pathology of these organs should be known. The operation for their removal is oöphorectomy.

I had my attention accordingly directed to such ovaries, and a number came to hand in the course of this year, which were removed by gynæcologists in the Royal Infirmary.

These were all removed for common symptoms, notably pain, long-continued and distressing, extending over a period of months or years, and which did not yield to palliative treatment; also dysmenorrhœa and other symptoms, reflex and local. In one case the other ovary, along with a large multilocular cystic tumour, was removed. This because it was cystic and enlarged, and was feared it might give rise to another tumour. In examining these specimens I was struck with the fact that they were all more or less cystically degenerated, and while investigating their pathology I sought to discover the origin and cause of cystic disease.

Cystic tumours, by the way, are of two kinds—simple and multiple. The simple or monothalamous are generally understood to be Graafian follicles distended with fluid (liquor folliculi) in a dropsical state, previous to rupture or after, and the ovum may be found. with fluid, destroyed or healthy, the follicle being within the tissue of the ovary.

A second form is the tubo-ovarian cyst, described in books as hydrops ovarium profluens, first by Blasius (*De Hydrope Ovarium Profluente*, Halle, 1834), and both ovary and tube participate in its formation, the line of demarcation being seen on the cyst walls. Richard (see Klob, *Pathol. Anatom.*, 1864) described the same, and believed fluid could flow from the uterus into the cyst. There is pigment observed on the walls formed by the ovary, the cyst being formed by the fimbriated end of the tube remaining attached to a ruptured follicle, and secretion taking the place of blood, it grows into a cyst, though never attaining any considerable size.

Another kind of cyst is the dermoid, long recognised by gynæcologists, which contains the elements of skin—together with its appendages, nails, hair, teeth, bones, and sebaceous matter poured out. The origin of these tumours is from a portion of the upper and middle germinal layers being misplaced at an early period of development.

Then follow the large ovarian cysts of the ovary of multiple growth. These are of two kinds, called respectively the papillomatous and glandular cystomata. The former is characterized by the growth of little papillomatous projections from the walls within the cyst, these covered by the large cylindrical epithelium. The other derives its name from the fact that the epithelium forms little follicular growths outwards, and these, again, may proliferate.

The contents of these cysts is a thick glairy-like fluid or colloid material, which may be highly inspissated or in a fluid state. Lastly, cysts may be formed in connexion with solid and malignant tumours, fibromata and adenomata, but it is not my intention to take up these, though I have had one specimen at least to illustrate.

I pass over the histology, anatomy, and development, also the physiology of the ovary.

There has been much written upon the subject of ovarian cysts from the commencement of literature, but it is only since 1848 anything intelligible upon the subject has been published. Fœrster and Virchow described the large ovarian cysts taking their origin in the ovarian stroma, this due to a colloid change in the cells of the stroma. Rokitansky also took a similar view.

Rindfleish wrote,—"Certain cysts are developed at the expense of a part of the ovarian connective stroma, which is softened and becomes colloid." Olshausen believes in the epithelial origin of cystoma of the ovary, and points out the *rôle* of the stroma is to participate in the growth of the tumour, but not give rise to it. Harris and Doran describe cysts arising out of the ovary from the remains of corpora lutea, seeking to prove the origin of epithelium out of endothelium or connective tissue elements.

Noeggerath (*American Journ. of Obstet.*, 1880) shows both cysts in the ovary, *i.e.*, simple and multilocular, arise out of bloodvessels and capillaries. Waldeyer, Klob, and others, together with Malassez and De Sinety, in their important work, believe large cysts of the ovary arise out of epithelium, and that alone existing in the ovary. It would seem there is still some light to be thrown upon ovarian pathology.

I examined a number of ovaries in the course of my microscopic work in the Laboratory of the Royal College of Physicians, and I found there ample material to investigate the origin of cysts. There was a noticeable feature in the majority of them, namely, the incidence of hæmorrhage and other manifestations of excessive determination of blood to the organ, the amount of blood pigment, and that in various forms—in one case like a mass of vermilion; the condition of the bloodvessels and their channels filled with blood, hæmorrhages into the stroma, into cystic spaces, into distended Graafian follicles under the surface, into lymphatics, and wherever blood can find its way. I believe the formation of cysts has to do with hyperæmia of the organ. Before proceeding further, I should like to mention the macroscopic appearance of one ovary. It was long and cylinder-shaped, about $\frac{1}{4}$ an inch in diameter, and the tube was also attenuated to the size of a crow quill. It was no doubt due to some error in development, one end having become attached high up to the parietes, and the whole lengthened in process of growth.

I studied the origin of simple cysts in the ovaries of a child three

years of age, and also observed processes the same in adult ovaries. The flattened epithelium of the membrana granulosa of a follicle at some depth begins to enlarge. It forms cubical epithelium, and goes on proliferating, but not to form the discus proligerus. The cells proliferate rapidly, and soon there is a mass of small round cells surrounding the ovum. The follicle swells and enlarges, fluid is poured out, and this presses the cells outwards from the centre. The stability of the ovum is interfered with, and it is sooner or later destroyed and disintegrated, the fluid goes on accumulating, the cavity enlarges, the small-celled growth is severed from the peripheral walls, and with the presence of the fluid they begin to die and quickly disintegrate, and the cystic space contains nothing but fluid and detritus, amongst which are leucocysts from the blood, showing the existence of hyperæmia. The surrounding layers of tissue have gone on strengthening and increasing around the cyst wall in a layer of nuclear proliferation, and occasionally small cuboid cells; beneath that is fine connective tissue and some strands of non-striped muscular fibres, often with small blood-vessels and lymph spaces; outside that is connective tissue, then stroma.

It is quite possible hydrops folliculi might occur, and particularly in those cases that exhibit an ovum and epithelium around, as described in Malassez and De Sinety's work (Part I.) But the process I have described seems to me the true origin of small cysts owing to a catarrhal affection of the follicles. A large number are affected at the same time, and hence the similarity in size. I have observed in the young ovary how follicles are heaped together with little or no stroma between; absorption takes place by their septa; they are distorted; there is coalescence of several; the ova run together, many die, and in this way cystic spaces might be formed. I have seen in older specimens a possible origin of cysts out of the stroma, necrotic centres filled with leucocytes and small cells, also in a corpus luteum or blood sinus; but blood is apt to be poured out in the first instance.

In the ovary removed from the case of multilocular cystic tumour I found adenomatous new formation in process of active development, and I show you sketches of these. And, first, of a large amount of epithelium found in another ovary, also removed, which exhibits the epithelial tracts in a quiescent state. The epithelial tubes are no doubt derived from epithelium which has existed in the ovary from the earliest periods of development. As the primordial ova were entering the stroma with trains of epithelium from the germ layer (the epithelium is more active than the stroma in early fœtal life) they were surrounded by epithelium and formed follicles. The epithelium remaining over, and which was shut off or snared by the stroma, was of no further service in the absence of ova, it was therefore retained in the ovary and remained located, at greater or less depth in the organ, as

functionless tubes of epithelium. I examined a fœtal ovary, and observed how the primordial ova got epithelium from the germ layer and from heaps of cells at the surface.

By some unknown ætiological cause, possibly brought in this excessive determination of blood and hæmorrhages, together with small cyst formation, the epithelium takes on activity. The flattened quiescent epithelium forms, first, cubical, then cylindrical epithelium, and in course of its activity forms offshoots and buds, also spherical masses, because in this way a greater amount of epithelium is contained in a given space, and once rapid proliferation has set in, there is no limit to its growth. I wish you to note first the flattened and obscure epithelium which becomes large, cylindrical, and highly stained.

In this connexion I refer you to what takes place in the lungs in pneumonia. The epithelium of the vesicles previous to the onset of the disease is flattened and situated regularly around the air vesicle; but when the agencies of pneumonia are at work it rapidly increases, it becomes cubical, cylindrical, and heaped together in great activity.

Fortunately the morbific influence at work leaves the lungs, and the epithelium quickly returns to its normal condition. In the case of the commencing cystomata of the ovary there is no return to the normal, and as the epithelium goes on multiplying and proliferating, all kinds of cylindrical epithelium are formed. Finally, it is according as the epithelium is in excess and forms little glandular sacs outwards, or the connective tissue stroma is very active and forms little papillomatous projections inwards, lined by epithelium, that we have the proliferating or the glandular cyst. Seeing that such are the pathological conditions and changes in the ovaries which were not markedly increased in size, and that they still contain healthy ova, it would be well to know if nothing short of the operation of oöphorectomy could be done to palliate, if not cure, the severe symptoms set up.

Dr Foulis said that thanks were due to Dr Martin for his great labour, and it was important to bear in mind that the work was done in the laboratory of the College of Physicians. The subject is an immense and a very difficult one, and he must confess that Dr Martin's results are not an advance on those of other observers such as Waldeyer and many others. Until the development and physiology of the ovary are understood its pathology cannot be mastered. Dr Foulis maintains that the cells surrounding the follicles are derived from the stroma. Some of these cells may get shut up in the stroma and give origin to cysts. Numerous cysts are formed near the hilum from Wolffian remains. Cystic ovaries are doubtless degenerated follicles.

The President said the subject was of enormous extent. The development of ovarian cysts appeared to him to be analogous to

the development of mucous cysts in the cervix, which were due to exaggerated physiological action of the part.

Dr Martin briefly replied.

VI. REPORT OF THE ROYAL MATERNITY AND SIMPSON MEMORIAL HOSPITAL FOR THE QUARTER ENDING 30TH APRIL 1888.

The Intern Cases are reported by F. A. JUCKES, M.B., the Extern by INGLIS TAYLOR, M.B.

INTERN CASES.

I. During the quarter (1st February to 30th April 1888) 67 cases were treated. These were—i.-paræ, 36; ii.-paræ, 16; iii.-paræ, 2; iv.-paræ, 2; v.-paræ, 4; vi.-paræ, 4; vii.-para, 1; ix.-paræ, 2: total, 67. Of the total number, 15 were married; of these, 2 were primiparæ.

II. *Age.*—Primiparæ: average, 22·1 years; oldest, 39; youngest, 16. Multiparæ: average, 26·6 years; oldest, 39; youngest, 18.

III. *Presentations.*—Primiparæ: vertex, 34; face, 1; breech, 1; Multiparæ: vertex, 30; abortion, 1.

IV. *Sex of Children.—Primiparæ* gave birth to 21 male and 15 female children.[1] Average weight of male children, 6 lbs. 12 oz.; average weight of female children, 7 lbs. 5 oz. Average length of male children, 20·1 inches; average length of female children, 19·7 inches. Heaviest male child, 9 lbs. 9 oz.; heaviest female child, 8 lbs. 13 oz. Longest male child, 22½ inches; longest female child, 21 inches.

Multiparæ gave birth to 15 male and 16 female—total, 31. Average weight of male children, 7 lbs. 5 oz.; average weight of female children, 7 lbs. 4 oz. Average length of male children, 19·6 inches; average length of female children, 19·5 inches. Heaviest male child, 9 lbs. 1 oz.; heaviest female child, 8 lbs. 12 oz. Longest male child, 21 inches; longest female child, 21½ inches.

V. *Premature labour* occurred in 10 cases—4 at seventh month and 6 at eighth month. *Abortion* occurred in 4 cases—2 at fifth and 2 at sixth month. Presentation in one premature labour was a footling.

VI. *Mortality*—

Maternal, 0.

Infantile, 5. All of these were premature. One lived for 14 days; the others died in a few hours.

Fœtal, 9. Of these, 4 were abortions; 1 a face presentation still-born; 1, the head was perforated on account of large child and deformed pelvis; 1, the cord was diseased and torn during

[1] Most of the premature children were males, hence the small average weight.

delivery. In other 2, cause of death was unknown. Three of the abortions were peeling.

VII. *Classification of Labours.*—Natural, 50; laborious and instrumental, 12; preternatural, 1; abortion, 4.

(*a.*) Of the *natural* labours, one is of interest. (1.) B. F., i.-para, æt. 25, a face presentation. It was not interfered with. The labour was a very short one. 1st stage, 7 hours 15 minutes; 2nd stage, 35 minutes; 3rd stage, 10 minutes: total labour, 8 hours. The child, which was a large one and weighed 8 lbs., was still-born. Its face was much discoloured. The measurements of mother's pelvis were normal.

(*b.*) *Laborious and Instrumental.*—One a high forceps case; the rest all low forceps cases. (1.) A. W., i.-para, æt. 25, R.O.P. persistent. 1st stage, 40 hours; 2nd stage, 4½ hours; 3rd stage, 20 minutes. Low forceps for delay in second stage. Large child. Cord round the neck. Cord was diseased and ruptured during delivery. Child was still-born.

(2.) A. M., i.-para, æt. 23, L.O.A. High forceps applied and head perforated as it could not be moved. Pelvis was fiddle-shaped. *Vide* special report. 1st stage, 24 hours; 2nd stage, 7½ hours; 3rd stage, 15 minutes.

(3.) M. H., i.-para, æt. 20, R.O.P. persistent. 1st stage, 8 hours; 2nd stage, 4 hours; 3rd stage, 5 minutes. Low forceps applied for delay in 2nd stage. Child delivered; persistent face to pelvis; very large head.

In all the other cases low forceps were applied for threatened inertia uteri or delay in 2nd stage.

(*c.*) *Preternatural.*—J. F., i.-para, æt. 20, a footling. 1st stage, 5 hours; 2nd stage, 15 minutes; 3rd stage, 30 minutes. Labour was artificially produced for deformed pelvis and great albuminuria. See special report.

(*d.*) *Abortions.*—Three of these were dead and peeling. The fourth was about fifth month, and just moved after birth, which occurred as patient was being brought to hospital in a cab.

Pregnancy complicated with Contracted Pelvis and Great Albuminuria and Dropsy.—J. F., i.-para, æt. 20, admitted 30th March 1888. Patient was born greatly deformed and of weak intellect. She had always enjoyed good health till two years ago, when she became very œdematous about the legs and abdomen. For the last four days before admission her urine had been very much reduced in quantity. Menstruation began at 16, and continued fairly regular till last August, since which time she has not menstruated. When seen, the whole surface of body and limbs were very œdematous and pitted deeply on pressure. The arms and hands were small and ill-formed, the wrists being kept in a state of partial flexion. A chronic abscess in left breast was discharging by four openings. The lower extremities were much deformed and very small. The right leg was 2 inches longer than

the left. The feet were so bent that she walks on the outer and dorsal surfaces. The pelvis appeared scoliotic, the right iliac crest being at a higher level than the left. The sacrum from below went up to the left, whilst the left innominate bone appeared twisted forwards, the right backwards. Measurements—il. cr., 9½ in.; il. sp., 8½ in.; intertrochanteric, 10½ in.; ext. conj., 7 in. The head of right femur was dislocated upwards and backwards. About 12 ounces of urine were passed in the 24 hours; much albumen and granular tube casts; no blood. The os was contracted, and she did not appear to be in labour.

Treatment.—She was given hot packs frequently, freely purged with pulv. jalap co., and ordered pot. acet., tr. digitalis, and tr. ferri mur. Diet, skimmed milk.

On *4th April* at 1.30 P.M. os was about size of a penny. Dr Underhill ruptured the membranes and pulled down a foot. Child was born five hours afterwards alive. Placenta came away easily. Patient put on pot. acet. and bromide, āā. gr. 20 every four hours. Milk diet.

5th April.—Child and mother doing well. She passed nearly ʒ50 of urine. Albumen much diminished in quantity.

8th April.—Œdema diminishing. Urine copious. Much less albumen. Blood present.

The child died on 17th April. It appeared to be about a seven-months' fœtus.

Patient steadily improved till 24th April, when she was discharged. There was still some albumen present and some blood. The œdema had almost entirely disappeared. The abscess sinuses in breast were split up and drained.

Case of Delivery after Perforation of Fœtal Head for Contracted Conjugate.—A. M., i.-para, æt. 23. Admitted 11th April; delivered 12th April. Pains began at 3 P.M. on 11th April. She was admitted that evening. The os was the size of a shilling, and the head could be felt at the brim. Diameters—il. cr., 10 in.; il. sp., 9 in.; ext. conj., 7 in. The pains continued very strong till 3 P.M. on 12th April, when, as the os was fully dilated, the membranes were ruptured. At 10 P.M., as pains still continued strong and head made no progress, Dr Underhill applied the axis-traction forceps. After pulling very hard for about half-an-hour, as the head could not be moved, it was perforated and a large quantity of brain scooped out. The head was then extracted with the forceps with some difficulty. Much force was necessary to get the shoulders through. The vaginal surface of perineum was lacerated a good deal. The skin surface was intact. The child weighed 9 lbs. 9 oz. Its left frontal bone was broken into several pieces and indented, apparently by the promontory of the sacrum.

On the evening of the fourth day of the puerperium her temperature rose to 101°·2, and the lochia was offensive. Uterus was washed out with 1 in 5000 corrosive lotion. On the fifth day she

had a rigor, and temperature rose to 103°·6. Uterus was again washed out, and she was given antifebrin gr. v. On the seventh day temperature rose to 102°·6. She was again given antifebrin, and uterus washed out. After this her temperature remained normal, and she made a good recovery. Discharged on the twenty-first day.

VIII. *Antiseptics.*—Corrosive sublimate solution was chiefly used. Vaginal douche 1 in 2000 used in each case night and morning. Where uterine douche was required the strength was 1 in 5000. Carbolic acid sol. 1 in 10 was used for the clothes and for evaporating in the wards.

Temperatures.—In 57 cases the temperature was quite normal, never above 99°·8 Fahr.; in the remaining 10 there was more or less rise of temperature. In 7 of these no treatment was required, the temperature varying from 100° to 102°, and being always traceable to some trifling cause, as nervous excitement; thus in 1 the temperature rose immediately after the first clinique of the quarter, but fell again to normal in a few hours. Of the remaining 3, in 1 the perineum was badly torn, and her breasts gave her some trouble. She was in Hospital seventeen days, and her temperature varied between 100° and 101°·6 on six occasions. The vagina was regularly douched with corrosive (1 in 2000), and she eventually recovered well. In the next case the labour was normal, but on the third evening the temperature rose to 102°·4, and as the discharge was rather offensive, the uterus was washed out with 1 in 5000 corrosive lotion. It was again washed out on the sixth evening. Her temperature remained slightly above normal all through, but she left Hospital on the twelfth day apparently quite well. The third case was one in which perforation was performed; the interior of the vagina was much lacerated, and the posterior wall of the uterus was believed to be bruised between the child's head and the sacral promontory. The temperature remained normal till the fourth evening, when it rose to 101°·2, and as the discharge was offensive, the uterus was washed out with 1 in 5000 corrosive. It was again washed out on the fifth evening, and on the seventh evening after this the temperature remained quite normal. In all these cases antifebrin was given in addition to the uterine douche.

Extern Cases.

During this term there were 174 cases. Of these 28 were primiparæ and 146 multiparæ.

Presentations.—Vertex, 163; breech, 8; transverse, 1; unknown, 3.

Positions.—L.O.A., 159; R.O.A., 1; R.O.P., 7; L.S.A., 6; L.S.A. footling, 2; L.A.A., 1; unknown, 3.

Twins.—Seven cases occurred. One was a primipara, 2 iv.-paræ,

1 v.-para, 1 viii.-para, 2 ix.-paræ. Their ages varied from 22 to 41 years.

Presentations and Positions.—In 2 cases both children vertex L.O.A. In 1 case, (1) L.O.A.; (2) L.A.A. In 1 case, (1) L.O.A.; (2) L.S.A. In 1 case, (1) L.O.A.; (2) R.O.P. In 2 cases presentation unknown.

Sexes of Twins.—In 3 cases both were males; in 3 cases both were females; in 1 case a male and a female.

Primiparæ gave birth to 15 male children and 14 female children.

Mortality.—Infantile, 1; fœtal, 1.

(1.) Infantile.—This was the second child of twins, and presented by the shoulder; it was turned and delivered, but the child was found to be dead, owing to the length of the labour.

(2.) Fœtal.—In this case the fœtus was in the eighth month, and was born dead and peeling.

Labours.—Natural, 23; laborious, 2; preternatural, 2; complex, 1.

(1.) Laborious.—Both cases of low forceps, applied in one case for delay in second stage from inertia; in the other, pains were ineffectual from bronchitis.

(2.) Preternatural.—One an ordinary breech case; in the other the cord was prolapsed.

(3.) Complex.—A case of twins; the second child presented by the shoulder, and was turned.

Multiparæ gave birth to 75 male children, 76 female children, and there was 1 early abortion.

Labours.—Natural, 126; laborious, 5; preternatural, 4; complex, 8; abortions, 3.

(1.) Laborious.—Four were cases of low forceps, and 1 of high, as the head would not come through on account of its size.

(2.) Preternatural.—Four breech cases; one with prolapse of cord, and the child died four hours after delivery.

(3.) Complex.—Six were cases of twins. One was a partial placenta prævia, which was successfully delivered. One was a complete placenta prævia with great hæmorrhage; the child was turned and delivered dead.

(4.) Abortions.—Three cases; 2 apparently due to syphilis, and 1 to maternal injury.

Mortality.—Maternal, 0; infantile, 4; fœtal, 8.

Infantile, 4.—(1.) Born and dead before the arrival of the nurses. (2.) In the case of complete placenta prævia. (3.) Due to prolonged labour. (4.) Pressure on the cord.

Fœtal, 8.—Three cases of abortion; others mostly peeling.

Special Cases.

Case I.—*Complete Placenta Prævia.*—Mrs S., 45, xii.-para. No symptoms till full time, and then great hæmorrhage. Os dilated

with Barnes' bags, and child then turned and delivered. Attempts to resuscitate failed. Mother did well.

CASE II.—*Post-partum Eclampsia.*—Mrs P., i.-para, æt. 19. Labour was short and comparatively easy, but patient looked pale and puffy about the eyes. After labour she complained of headache and dimness of vision, and on the following afternoon she was only semiconscious and perfectly blind. The first fit then occurred; it was slight, and soon passed off, but left her quite unconscious. Croton oil, ℥ss, was then administered, and a hypodermic injection of pilocarpin, gr. ¼. This produced profuse sweating, but the oil had no effect. At 8 o'clock P.M. the fits were becoming more marked, and there was deep coma, so croton oil was again administered, this time with good effect, and another ¼ gr. of pilocarpin was given, again causing great sweating, but also making the breathing very stertorous. About ℥j. of urine (all that was in the bladder) was drawn off; it was very bloody, and almost coagulated on heating. Grs. 20 of chloral hydrate were now given, and about 12 o'clock P.M., as the fits were now almost continuous, chloroform was given for about an hour, the kidneys were dry-cupped, and she was well packed with hot things. The fits now passed off, and grs. 40 chloral hydrate were given, and she was allowed to rest. No more fits occurred, and next day chloral, 20 grs., and bromide of potassium, 30 grs., were given twice, at intervals of four hours, and also a diuretic at intervals, the kidneys soon beginning to act freely. She was kept on milk, and improved steadily until quite recovered.

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